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'Knowledge is proud that he has learned so much,
Wisdom is humble that he knows no more.'—COWPER.

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CHILD LABOUR.

BY RICHARD WADDINGTON,
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THE present state of the law on child labour is such a mass of contradictions and inconsistencies as must demand the serious attention of our legislators ere long. Take the full-time employment of children. Under the Education and Factory Acts, a child may work at fourteen years of age, or, after passing the Fourth Standard (or making 250 attendances in not more than two schools for each of five years since the fifth birthday), the child may work at thirteen years of age. Under the Education Act a child may work full-time at ten years of age, after passing the exemption standard fixed by the local bye-laws. The standards fixed are :—

STANDARD	IV.	V.	VI.
Parishes	6,766	4,016	38
Municipal Boroughs under School Boards	17	120	19
Municipal Boroughs under School Attendance Committees	49	70	1
Urban Sanitary Authorities under School Attendance Committees	20	47	3
	6,852	4,253	61

This exemption standard qualification at ten years of age is doing much to retard educational progress. In the large majority of cases as soon as the child reaches the exemption standard it ceases to attend school, and if it has failed to obtain employment may be seen hanging about our streets. Armed with an exemption certificate the child may be employed as a butcher, but not a baker; a shopkeeper, but not a tailor; a furniture broker, but not a cabinet maker; a carter, but not a wheelwright; a book-keeper, but not a bookbinder; a clerk in an office, but not in a warehouse.

Under the Mines Act a boy may work underground at twelve years of age without an educational certificate being required, although he cannot work at the pit mouth until he is fourteen or thirteen and having passed the required standard. In twenty-seven school districts in England and Wales there is freedom from compulsory attendance at the tenth birthday irrespective of educational proficency. What a huge travesty of the intention of the Education Acts! No wonder that in the last Report of the Committee of Council on Education (1890-91) we find that out of 482,369 children presented in Standard IV. in 1889, as many as 166,764 disappeared from the examination lists of our schools in 1890; while the 313,364 scholars in Standard V. of 1889 fell in the year to 138,273, and the 138,864 scholars in Standard VI. to 41,286. To paraphrase the statement of 'my lords,' the upper standards of our primary schools present a beggarly array of empty benches. And for this the country is paying nearly ten millions a year, deluded by the fact that it is equipping the artisan of the future with the wherewithal to pursue a useful course of technical education. Exemption at ten years of age may have been an admirable coating for the compulsory pill administered by the Act of 1870, but after twenty-one years of this it is not too much to ask that there shall be no exemption before thirteen years of age, especially when we remember that the representatives of labour assembled at Newcastle voted almost unanimously in favour of this change.

Under the Education and Factory Acts a child may work half-time at ten years of age after passing the standard fixed by the local bye-laws. The standard so fixed is generally the Third; but in twenty-seven parishes under School Attendance Committees the standard demanded is the First. The Second Standard is demanded in

1152 parishes under School Attendance Committees;
11 Municipal Boroughs under School Attendance Committees, including Chorley, Darwen, and Glossop;
15 Municipal Boroughs under School Boards, including Bacup, Dewsbury, Halifax, Keighley, Macclesfield, and Rochdale;
18 Urban Sanitary Districts under School Attendance Committees.

Next year the age under the Factory Act will be eleven. Unless some effort is made to codify and

unify these several Acts in many of the districts where the local authorities only enforce half-time attendance after the standard has been passed, irrespective of all question of employment, the children will run the streets for a year until they reach eleven, and can find employment under the Factory Act.

The requirement of a certificate of having passed a standard is denying the benefits of the New Code to both teachers and scholars, especially in the manufacturing districts, where the be-all and end-all of a child's school life is the possession of a labour certificate.

So real is the difficulty that last month several School Boards, including Leeds and Leicester, asked Sir W. Hart-Dyke to get the 'sample pass' made the pass for labour. The difficulty must be an evident and acute one when such advanced educationists advocate so retrograde a policy. At present a child must pass in reading, writing, and arithmetic for the labour qualification. Examined by 'sample,' he passes in one only of the three subjects. The attainment of the qualification in towns like Rochdale, where Standard II. prevails for half-time, is easy enough already; but with 'sample' examination there would be practically no qualification in force. Again, the 'sample' pass would still keep the cast-iron rule of standards in full view of parent, teacher, and scholar. All possibility of eradicating the unhealthy spirit at present pervading the mind of the parent and scholar would be at an end. This is certainly not the solution of the present complications.

There is for full-time employment at present under the Education and Factory Acts an attendance qualification. Any child being thirteen years of age, who produces a certificate of five years' regular attendance, can enter the labour market. The National Union of Teachers and the Half-Time Council of Teachers suggest that herein lies the solution of the present difficulty. With a few slight alterations in the mode of fixing the attendance, and the substitution of an aggregate for the school life in lieu of a yearly attendance, this would meet the interest of the parent and the State.

The State has a right to demand that the education of the children shall be sufficient. With the present system of inspection and supervision there can be no fear in acknowledging the principle that attendance at a primary school means educational proficiency if possible. The parent has a right to demand that the qualification shall be within the reach of the child under normal conditions. An attendance qualification makes it possible for every child, whether mentally quick or dull, to obtain the required certificate. But an attendance qualification has other advantages; it would make the parent an auxiliary of the attendance officer; and it would expel from the school and the home that uneducational anxiety about the passing of a standard. It would be possible to obtain uniformity in place of the present anomalous variety. There would be considerable difficulty in getting the Local Authorities to raise the standards, but by introducing a new qualification we should get National uniformity.

Some attempt will have to be made to consolidate the various Acts bearing on the employment of children, and when this is done it is to be hoped that the present clause in the Factory Act, which fixes the qualifications for full-time, will form the model. Under this clause the Secretary of State, with the consent of the Education Department, can fix the requirement in addition to age by 'minute.' At the present time the Home Secretary can raise the standard for full-time by notification in the *London Gazette*; whereas, the standard under the Education Act can only be raised by an Act of Parliament. The clauses might be:—

Every person who takes into his employment a child of the age of eleven (after the 1st of January, 1894, twelve), before that child has attained such standard of previous due attendance at a certified school, as hereinafter mentioned, shall be deemed to take such child into his employment in contravention of this Act, and shall be liable to a penalty accordingly. When a child of the age of thirteen has obtained from a person authorised by the Education Department a certificate of having attained such standard of previous due attendance at a certified efficient school as hereinafter mentioned, that child shall be deemed a young person for the purposes of this Act.

The due attendances for the purpose of these sections shall be such as may be from time to time fixed for the purposes of this Act by the Education Department, and the due attendance so fixed shall be published in the *London Gazette*, and shall not have effect until at least six months after such publication.

It would then be possible to raise the requirement in addition to age from time to time without recourse to the legislature, and the qualification would be the same for the whole country.

The success of our Factory Acts is largely due to the administration of the Factory Inspectors. So long as the initiation of compulsion rests in the hands of the small local authorities, very often themselves the chief employers of child labour, there can be little progress. Therefore, it is imperatively necessary that the pettifogging School Board shall be improved off the face of the earth. Inspectors of Attendance are absolutely necessary to the full and complete realisation of compulsion. These should be appointed imperially just as the present Factory Inspectors are. Here is a factory in the middle of a potato-field; in a few months half-time in the mill will not be permissible until after the eleventh birthday. *Full-time* in the potato-field will still be possible twelve months earlier! Suppose a child is illegally employed in the factory, in walks the Factory Inspector; but the boy in the potato-field may be disregarding a score of bye-laws, and the Factory Inspector is powerless. The person who can interfere is very often the actual employer.

Again, here is a factory and a coal mine side by side. *Full-time* in the former commences at thirteen, in the latter at twelve. In the former full-time cannot commence at thirteen without a proficiency qualification; in the latter the child may commence at twelve if illiterate.

So many and varied are the requirements, that some attempt must be made to reduce the mass of contradiction to order and uniformity. When this is attempted care should be taken to ensure:—

1st.—Uniformity in all kinds of employment (unless an exception be made in the mines to carry out the suggestion of the Berlin Congress that no child should work underground under fourteen years of age).

2nd.—The appointment, imperially, of Inspectors of Attendance to do for other employments the same work that the Inspectors of Factories do for factories and workshops.

WELL-KNOWN TEACHERS AT WORK.

X.—MR. HERBERT A. JOHNSTONE.

Brentnall Street Higher Grade School, Stockport.

STOCKPORT has for a very considerable period been well known for the interest it has taken in educational matters. In the days anterior to Codes and Government Grants, the town possessed many flourishing day schools and an endowed Grammar School, under the patronage of the Goldsmiths' Company of London. The Stockport Sunday School also is an institution which has had a long and prosperous career, and which some fifty or sixty years ago had an attendance of over five thousand scholars. Its management and support are entirely undenominational, and although very many denominational schools have of recent years been established, the Stockport Sunday School still holds a prominent position. The number of children on the books in 1891 was 5,127, and of teachers 437, requiring an annual income of over £1,000 for its maintenance.

H. A. Johnstone

Stockport also is the only town of any considerable importance which has, after a trial of a few years, dissolved its School Board. It now relies entirely on the voluntary system for the education of its citizens. How satisfactorily that has been accomplished a perusal of the following return from the School Attendance Committee for the Borough of Stockport will readily show:—

Denomination	1870		1891	
	Number of Schools	Average	Number of Schools	Average
National	6	1,173	10	5,956
Wesleyan	3	938	4	3,019
Roman Catholic ...	3	806	3	1,142
British	1	118	6	2,704

It was therefore with considerable interest that Stockport was visited in order to see one of these schools at work, that an account might be placed before your readers of its head-master, through whose efforts and ability its rise, progress, and success have been achieved.

The Brentnall Street Schools are well situated on the highest ground in the town, and in one of its broadest thoroughfares. The immediate neighbourhood is well supplied with elementary schools, as four were observed almost within a stone's throw.

The buildings were erected with a view to their adaptability for Sunday as well as Day School purposes. At the front there are two principal entrances, one for the infants, the other for the girls, whilst the boys' entrance is through the playground at the rear of the building. There are two departments, a mixed and infants', for which the arrangements of the entrances, cloak-rooms, and necessary offices are well adapted.

On the ground floor on the right of the entrance there are, besides a common room for the teachers, six class-rooms for the mixed department; two of these are fitted with galleries, the others are arranged with desks. There is also a cloak-room for the girls which leads into the girls and infants' playground. On the left of the entrance there is an inside connection with the Infants' Room and the class-rooms and cloak-rooms used by that department.

On the first floor, which is reached from the entrance hall by a very wide and imposing staircase, is the large room for the mixed school. Two other very large class-rooms, together with a smaller class-room, and the head-master's private room, are on the same floor. The large room is arranged with a gallery at one end capable of accommodating two hundred children, and a smaller one at the other end provided with desks, whilst the rest of the room is equally divided, one-half arranged with desks, five deep, lengthways of the room from gallery to gallery. The playgrounds are small considering the number of children in attendance, and it is thus impossible to provide anything in the form of a gymnasium; but to a large extent this has been rendered unnecessary by the provision in the immediate vicinity of several open spaces available for sports and outdoor amusements of various kinds.

The school-rooms, class-rooms, cloak-rooms, and halls are well heated by hot-water pipes, and the supply of fresh air is well provided for by air-grids and ventilating-frames to the windows, and thus the health and comfort of both teachers and scholars are well secured.

Mr. H. A. Johnstone, who is the subject of our sketch of 'Well-known Teachers at Work,' for the present month, has been the head-master of these schools from the date of their opening in January, 1870. He was a pupil teacher at the Greetland Wesleyan School, near Halifax, and in the autumn of 1858, one year

before his apprenticeship was at an end, he entered the Wesleyan Training College as a preparatory student. In December of that year he gained a First Class Scholarship, and was the fourth on the College list of successful students. At the end of his two years of residence there (1859-60) he was placed in the first class at the examination for certificates, and also succeeded in winning the College prize for Religious Knowledge. In January, 1861, he undertook the charge of opening and organising the Wesleyan School at Didsbury. By its establishment near the Didsbury College for Wesleyan Ministers the promoters, the Rev. J. Bowers, the Governor of the College, and others, desired to afford an opportunity for the students for the Ministry to acquire a knowledge of the working of the national system of education as supported and encouraged by the Education Department. For some time the school was worked under difficulties, as the new buildings were unfinished, and temporary provision had to be made in an upper room over two or three cottages, and it was not until May that the new buildings were complete.

In the report to the Wesleyan Conference of this year, 1861, the Governor reported:

'The Day School has recently been opened under very favourable auspices, and when fully in operation it will prove, as we trust, an auxiliary to the training of the students by giving them an opportunity of acquiring a familiar knowledge of our connexional system of Day School instruction, and by creating an interest in this department of our work.'

There can be no doubt that this result was obtained, as the increased number of Wesleyan Schools established during the decade 1870-80 plainly indicates.

During the nine years Mr. Johnstone remained at Didsbury the history of the school was one of continued progress and success. In 1868, the year in which his certificate was raised to the first division of the first class, the report on the school was:—'The school is in a most satisfactory state. The order is thoroughly good and the instruction no less excellent.'

Whilst at Didsbury Mr. Johnstone undertook much extraneous work, and in connection with the Wesleyan Church in the village was organist, choirmaster, secretary and superintendent of the Sunday School, society steward and president of the Young Men's Debating Society.

To these duties, which were voluntarily, cheerfully, and heartily undertaken, he added singing classes in Manchester, Didsbury, and the neighbouring villages. Work such as was done at Didsbury could not fail of honourable recognition, and when Mr. Johnstone removed to Stockport in 1870, his departure was felt to be a great loss to the neighbourhood, and souvenirs many and valuable were presented him, testifying to the appreciation of his services and the gratitude of all those for whom he had so ungrudgingly devoted nearly if not all his leisure time. A gold watch and chain, timepiece, ornaments, and several gratifying addresses were among the many presentations made.

The work at Didsbury was an admirable preparation for the new work which was to be done in Stockport. The grief at parting with so many pleasant and happy associations connected with Didsbury was only relieved by the possibilities of a wider sphere of action and usefulness at Stockport. Those who have known him during the past twenty-two years of his life at Stockport know how thoroughly those possibilities have become realities, and what a powerful influence his school has exercised in the education, both morally and mentally, of the youth of Stockport.

In the first week fifty children were admitted, and there was a regular and constant increase until the full complement was reached in 1877, since which date the school has remained invariably full, and large numbers of children have had to be refused admission.

The first Government Report, after nine months work, was: 'The school has made an excellent start. It is in very good order, and taught with much intelligence and success.'

The Report in 1873 was: 'These children are remarkably well taught and disciplined.' And that for 1875: 'Mr. Johnstone still conducts this school with great spirit and ability.'

From the commencement the school was conducted as one of a 'Higher Grade.' The upper classes received instruction in French, Algebra, Geometry, History, etc., and thus its reputation was established as one where an education could be obtained beyond what was usual at that time in most elementary schools. The school by this means acquired the name of 'Higher Grade,' and this title in 1887 was adopted with the sanction of the Education Department, and the schools are now known as the Brentnall Street Wesleyan Higher Grade Schools.

One of our visits to the school was made just at the hour of assembly in the afternoon. The whole of the children were in the playground, which was so crowded that no games were possible other than those which could be practised with the least amount of movement.

BRENTNALL STREET WESLEYAN HIGHER GRADE SCHOOLS, STOCKPORT—TIME TABLE.

			Morning						Afternoon					
Days	9 to 9.30	Stands.	9.30 to 10	10 to 10.30	10.30 to 11	11 to 11.15	11.15 to 12	Days	Stands.	2 to 2.40	2.40 to 3.10	3.10 to 3.45	3.45 to 4.15	4.15
Monday	Opening Service — Commandments, and Creed; or Psalm	Ex. VII.	Reading	Geography	French	Play or Talk — Lunch	Arithmetic	Monday	Ex. VII.	Composition	Writing	Revise Arithmetic	Tots	Dismissal
		VII.	Reading	Geography	French		Arithmetic		VII.	Composition	Writing	Revise Arithmetic	Tots	
		VI.	Reading	Geography	French		Arithmetic		VI.	Composition	Writing	Revise Arithmetic	Tots	
		V.	Reading	Geography	Recitation,		Arithmetic		V.	Composition	Writing	Revise Arithmetic	Tots	
		IV.	Reading	Geography	Singing, or Mental		Arithmetic		IV.	Composition	Drawing	Revise Arithmetic	Tots	
		III.	Reading	Geography	Arithmetic		Arithmetic		III.	Revise Arithmetic	Tots	Writing	Drawing	
		II.	Arithmetic	Spelling	Writing		Arithmetic		II.	Reading	English	Geography	Mental Arithmetic,	
		I.	Drawing	Drawing	Drawing		Arithmetic		I.	Reading	English	Geography	Tables & Singing	
Tuesday	Opening Service — Catechism with Explanation; or Psalm.	Ex. VII.	Reading	English	Revision Questions, Schedule IV. Singing and Recitation Dictation Dictation	Play or Talk — Lunch	Algebra	Tuesday	Ex. VII.	Notes	Composition	Chemistry	Chemistry	Dismissal
		VII.	Reading	English			Algebra		VII.	Notes	Composition	Chemistry	Chemistry	
		VI.	Reading	English			Algebra		VI.	Notes	Composition	Map	Tables	
		V.	Reading	English			Algebra		V.	Notes	Composition	Map	and	
		IV.	Reading	English			Reading,		IV.	Writing	Dictation	Map	Mental Arithmetic	
		III.	Reading	English			Writing,		III.	Map	Tables and Mental Arithmetic	Writing	Dictation	
		II.	Copy-Books	Copy-Books			and		II.	Reading	English	Geography	Mental Arithmetic,	
		I.	Arithmetic	English			Speiling		I.	Reading	English	Geography	Tables & Singing	
Wednesday	Opening Service — Learn New Hymn	Ex. VII.	Reading	English	Animal Physiology	Play or Talk — Lunch	Arithmetic	Wednesday	Ex. VII.	Drawing	Drawing	Drawing	Map	Dismissal
		VII.	Reading	English	Animal Physiology		Arithmetic		VII.	Drawing	Drawing	Drawing	Map	
		VI.	Reading	English	Animal Physiology		Arithmetic		VI.	Drawing	Drawing	Drawing	Map	
		V.	Reading	English	Animal Physiology		Arithmetic		V.	Drawing	Drawing	Drawing	Map	
		IV.	Reading	Geography	Object Lesson		Arithmetic		IV.	Drawing	Drawing	Grammar	Map	
		III.	Reading	Geography	Object Lesson		Arithmetic		III.	Map	Grammar	Drawing	Drawing	
		II.	Drawing	Drawing	Drawing		Arithmetic		II.	Reading	Object Lesson	Geography	English	
		I.	Writing on Slates	Tables	Mental Arithmetic		Arithmetic		I.	Reading	Object Lesson	Geography	English	
Thursday	Opening Service — Bible Lesson	Ex. VII.	Reading	Physiography	Physiography	Play or Talk — Lunch	Arithmetic	Thursday	Ex. VII.	Algebra	Algebra	Mathematics	Mathematics	Dismissal
		VII.	Reading	Physiography	Physiography		Arithmetic		VII.	Algebra	Algebra	Reading	Mental Arithmetic	
		VI.	Reading	English	Animal Physiology		Arithmetic		VI.	Algebra	Algebra	Reading	Mental Arithmetic	
		V.	Reading	English	Animal Physiology		Arithmetic		V.	Algebra	Algebra	Reading		
		IV.	Reading	English	Singing		Arithmetic		IV.	Geography	English	Reading	Easy	
		III.	Reading	English	and Recitation		Arithmetic		III.	Geography	English	Reading	Revision	
		II.	Writing on Slates	Grammar	Singing		Arithmetic		II.	Geography	English	Reading	Problems	
		I.	Copy-Books	Copy-Books	Writing on Slates		Arithmetic		I.	Geography	English	Reading		
Friday	Opening Service — Bible Lesson	Ex. VII.	Reading	Geography	French	Play or Talk — Lunch	Arithmetic	Friday	Ex. VII.	Copy-Books	Copy-Books	Revise Arithmetic	Singing	Dismissal
		VII.	Reading	Geography	French		Arithmetic		VII.	Copy-Books	Copy-Books	Revise Arithmetic	Singing	
		VI.	Reading	Geography	French		Arithmetic		VI.	Copy-Books	Copy-Books	Revise Arithmetic	Singing	
		V.	Reading	Geography	Recitation,		Arithmetic		V.	Copy-Books	Copy-Books	Revise Arithmetic	Singing	
		IV.	Reading	Geography	Singing, or Mental		Arithmetic		IV.	Copy-Books	Copy-Books	Revise Arithmetic	Singing	
		III.	Reading	Geography	Arithmetic		Arithmetic		III.	Revise Arithmetic	Singing	Copy-Books	Copy-Books	
		II.	Copy-Books	Copy-Books	Writing on Slates		Arithmetic		II.	Reading	Singing	Geography	English	
		I.	Writing on Slates	Grammar	Singing		Arithmetic		I.	Reading	Singing	Geography	English	

Registers closed 9.45 a.m., and 2.15 p.m.

Girls—Needlework, Tuesdays, 11 to 12, and Thursdays, 2 to 4.15.

Girls—Domestic Economy, Tuesdays, 10 to 11, and Thursdays, 3.15 to 4.15.

Girls—Cookery, Tuesdays, 9.30 to 10.30, or 12.

Boys and Girls—Drill in Sections, Thursday Afternoons.

At two o'clock, at the sound of the whistle, the whole scene was changed, every one remaining in the position he or she was at the time the signal was given. The pupils then formed themselves into lines in classes and marched to their respective rooms.

The number present was over eight hundred, more than six hundred being in the mixed school.

These are arranged, as will be seen from the time-table, according to standards, but each standard is divided into classes, so that the number in each class shall not as a rule exceed forty. Each standard is under a thoroughly qualified assistant, who is responsible for the work of the whole of the standard; but a pupil teacher or ex-pupil teacher is provided for every class.

At present, besides the head-master and mistress of the infant school, there is a staff in the mixed school of two certificated assistant masters, three certificated assistant mistresses, three ex-pupil teachers, six female and three male pupil teachers, and five paid monitors; and in the infant school, one ex-pupil teacher, three pupil teachers, and two paid monitors.

A most pleasing feature respecting the staff is that nearly all have been trained in the school and have either remained after the termination of their apprenticeship, or have returned as soon as vacancies have occurred.

An analysis of the time-table here appended gives the number of hours devoted to each subject.

Subject	Standards— 1	2	3	4	5	6	7††
Religious Training	2½	2½	2½	2½	2½	2½	2½
Reading	4	3	3½	3	4	3	2½
Arithmetic	4	4	5	5	4½	4¼	4½
Drawing	1¼	1½	1½	2½	1½	1½	1½
Geography	2	2½	1½	1½	1	1	1
French	...	...	...	...	...	1	1
Recitation	1	1	1	1	½	...	...
Writing	4	4½	2½	2½	1½	1½	1½
English	2½	2½	2	1½	2½	2½	1½
Mental Arithmetic	1½	1½	1½	1½	1	½	...
Physiography	...	...	...	...	...	...	1½
Singing	1½	1½	1½	1	1	½	½
Physiology	...	...	...	...	1½	1½	½
Object Lesson	½	½	½	½	...	...	...
Algebra	...	...	...	...	1½	1½	2½
Composition	...	...	...	1	1½	1½	1½
Map	...	...	2	1½	1	½	½
Chemistry	...	...	...	...	...	1	1
	25	25	25	25	25	25	25

Girls.—Needlework ... ... 3½ hours.
Domestic Economy ... 2 "
Cookery ... ... 1 to 2½ hours. The latter when practice is added to Demonstration Lesson.

Boys and Girls.—Drill in sections, ¾ hour. Each under the instruction of a regular Drill Instructor.

Extra Science Classes,
Which do not appear on the time-table, are held—

Wednesdays, 7.45 to 8.45 a.m. Hygiene, for Ex. VII. and Pupil Teachers.
Thursdays, 7.45 to 8.45 a.m. Mathematics, St. II.
Wednesdays, 4.15 to 5.15 p.m. Physiography, for Pupil Teachers and boys passed St. VII.

In the time-table 'English' is understood to include Recitation, Analysis, Parsing, Etymology, and Spelling.

It must also be remarked that English History is taken throughout the school as a Reading Lesson, for which sets of Historical Readers are provided for each class.

Science in the Third Standard and upwards is taken in the same way.

Great latitude is allowed the teachers in each standard as to the order in which the lessons are taken, and also as to the exact amount of time devoted to each portion of a subject. Three or four sets of Readers are provided for each standard, and for the upper classes, a school newspaper and other periodicals, and thus excellent results are secured in fluency and in intelligent and expressive reading.

Wherever alternative subjects are arranged for any given time, the teacher may at his or her discretion take the whole of the time to any one of these subjects or divide the time as is thought best, in order to meet the requirements of the bi-monthly examination.

This examination is an important factor in securing the desired success at the end of the year, and is a marked feature in the working of the school. The results of the examination of each class are carefully registered, and afterwards combined for each standard.

This bi-monthly examination necessitates the work of each standard being divided, and a work sheet is consequently drawn up, setting out how much of the year's work will be required at any given examination.

The following, which is the work sheet of Standard VII. and upwards, shows how the work is subdivided for the present year in that standard.

WORK SHEET.—Standard VII. and Ex.-VII.

Subject	1st	2nd	3rd	4th	5th	6th
Reading	Any book	especially	Shak-	speare	Geog.	Hist. and Newspaper
Writing	Letter	Theme	Letter	Theme	Letter	Theme
Arithmetic ...	1-6th	1-3rd	Half	3-4th	Whole	Whole
Geography ...	"	"	"	"	"	"
Grammar	"	"	"	"	"	"
Map	Unit. Stat.	England	N. America	All	All	All
Mental Arith	All	All	All	"	"	"
Tables	"	"	"	"	"	"
Drawing	Fr. & Mod.	Fr. & Mod	Fr. & Geom.	"	"	"
Singing	All	All	All	"	"	"
Science.....	May	May	May	May	Half	"

Note.—By *May* is meant the work in those Science subjects which are to be taken at the Science Examinations in May.

The results of these bi-monthly examinations were posted in a prominent position in the schoolroom. A specimen of this return is annexed, which may be taken as an index of the thoroughness which enters into every part of the work. The spirit of emulation which is thus awakened, both among the teachers and children, is an important means by which the uniformly excellent results obtained at the examinations at the close of the official year are secured.

Class	No. Pres.	Maximum— 3 Reading	3 Writing	4 Arithmetic	10 R. W. A.	3 Geography	3 Grammar	3 Recitation	3 Tables	3 Mental Arithmetic	3 Singing	3 Etymology	3 Intelligence & Discipline	3 Books	3 Object Lesson
4	39	3	2·7	3·8	9·5	2·7	2·7	2·7	3	2·7	2·7	3	3	3	2·7
7	46	2·7	2·9	3·6	9·2	2·7	2·4	2·7	2·4	2·4	2·7	3	2·7	2·7	2·4
1b	41	2·7	2·8	2	7·5	2·4	1·2	2·7	2·7	2·7	2·4	2·7	2·4	3	2·7
9	38	1·7	2·5	2·3	6·5	2·4	2·4	2·4	2·4	1·5	2·7	2·7	2·7	2·4	1·5

Thus the whole of the classes are arranged, irrespective of standards, in order of merit.

The above gives the results of the two highest and two lowest classes at the last examination.

Another tabulated result, given below, is also drawn up, giving the position of each standard in the three subjects, Reading, Writing, and Arithmetic.

Standard	No. Present	Maximum— 3 R.	3 W.	4 A.	10 Total	Mark.
II.	111	2·8	2·5	3·5	8·8	V.G.
VI.	35	2·9	2·9	2·8	8·6	V.G.
VII.+	51	2·9	2·8	2·7	8·4	G.
V.	72	2·9	2·6	2·7	8·2	G.
III.	105	2·7	2·7	2·8	8·2	G
I.	117	2·3	2·8	3·1	8·2	G.
IV.	85	2·6	2·9	2·2	7·7	F.G.

It is hardly necessary to point out how stimulating both to teacher and class these results are, especially when it is remarked that class 4, which is at the top of the class list, forms a part of Standard II., the other classes of which Standard are 6th and 7th respectively in the class list.

Home work is regularly given throughout the school, but is limited in quantity, and therefore great attention is expected to be paid to neatness and thoroughness.

The home work set for Standard VI. on our visit was one problem in Arithmetic, a sentence in Analysis, and some Physiology. In Standard III. the work set was twenty words of Spelling, Recitation, and a lesson in Geography.

The children attending the schools are mostly from the homes of people in comfortable circumstances, and hence the difficulty of securing the proper preparation of home work is not experienced.

The Fees charged since the adoption of the Assisted Education Grant of last year are—for Standards I. and II., 4d. per week, and for Standard III. and upwards, 6d. The fact that about one half of the children pay their fees quarterly proves the statement made above as to the class of children attending the schools.

Mr. Johnstone, in reply to our question as to his opinion of the working of the Mixed System, said :

'As a mixed school, the influence of the opposite sexes on each other is marked, but this is rather a subject for an essay on the advantages and disadvantages of the Mixed System ; but I may say the advantages are so great and obvious that the disadvantages appear not deserving of consideration.'

'How do we manage ?

'1.—Separate entrances are provided in different streets for the boys and girls.

'2.—Separate cloak rooms, lavatories, and playgrounds are also provided.

'3.—Boys march to their places, then the girls follow, and sit or stand in front as the case may be. No communication whatever need pass between them, and it may be asserted with certainty that the whole tendency of the influence of the girls is towards good order, neatness, gentleness, and conscientiousness. No difficulty has ever arisen through having the sexes thus mixed, and the good which is done by the influence the one exerts over the other, and the two combined on the teacher, cannot be over-estimated. The tendency is to make school as one large family.'

Again, in reply to a question as to the system of rewards adopted, Mr. Johnstone said—

'For convenience in marking the lessons, tickets are distributed. These are of cardboard, about half an inch square, and marked to prevent the possibility of dishonesty. The tickets in use are of three kinds (1) Ordinary white, (2) Blue (worth ten white), and (3) Green (worth five blue). The children keep their own record of marks up to Friday, when the tickets are collected and registered. At the end of each four weeks the places in class for the next month are decided by the number of marks thus gained. At the close of the School year class prizes are given to those having the highest marks in each class. The inscription on each prize awarded is "For good attendance, diligence, and good conduct"; thus the prize becomes a certificate of merit. This system works well, as it has been found that both the boys and girls are very anxious to avoid low places, even if they cannot secure the highest.

'One of the great advantages obtained from this plan is that it necessitates a judgment on the work of every pupil in every lesson. Exercises, such as Composition, which need reading through, are always produced on separate papers, and never in the ordinary exercise books. These are collected, read and marked at leisure, but Arithmetic, Writing, Maps, etc., are marked at the close of the lesson. Every finished copy-book, map-book, exercise-book, and drawing-book is examined by me personally, and marks are given according to merit. Bad marks necessitate the forfeiture of tickets already obtained.'

Again asked 'What is your experience as to the Pupil Teacher System and the adoption of centres for teaching ?' Mr. Johnstone replied :

'My difficulty is in making a selection from the number of candidates who are desirous of entering as pupil teachers. We have always a number to choose from. I should not like the centre system myself for the teaching of our pupil teachers. I consider it a matter of the greatest importance that the young teachers should daily come before me, not only for instruction, but for direction in their studies and hints as to their methods of managing and teaching their classes. Our whole staff, certificated, assistant, and pupil teachers, meets every morning at 7.45 during winter and summer alike. It is then that

'1. Needlework is prepared.

'2. Exercises and Examination Papers corrected.

'3. Registers and all Returns prepared.

'4. Pupil Teachers instructed, in which the Certificated Assistants take part.

'5. Conversations on Methods are held, and observations made on the work of the past day or that about to commence, and thus unity of aim and method is secured.

'The pupil teachers also remain from 12 to 12.30 for further lessons.

'The work thus arranged permits of all the staff being free at 4.30 p.m., and avoids any necessity for the teachers taking any of the children's work home either for correction or preparation.'

In reply to our question as to the efficiency of the work of the School Attendance Committee of the Town Council, Mr. Johnstone said :

'We can do very well without the services of the Attendance Officer, as we are so favourably circumstanced. We give prizes for regular attendance, and to those only who have not been absent more than twice during the school year; and at our last distribution there were 159 children who had the prize awarded to them. One boy had not been absent for eight years, one girl for seven years, eighteen others had not been absent for three years or over, and fifty-four others had not been absent for one year or over. As a rule the average number present during the week of those on the books is 96 per cent., the daily average being over 94 per cent.'

In the prospectus of the school, a copy of which is given to every parent whose child is admitted, is found the following paragraph :—

'Punctual and regular attendance is of the utmost importance. Children staying at home half-a-day are fined a halfpenny, two half-days or more, a penny, and those who persist in irregular attendance without reasonable excuse are liable to be dismissed from the school.'

During every school time Mr. Johnstone visits each class to inquire whether there are any children for the Black List. That is a list of those who are present, after having been absent one or more half-days and have not paid their fines. It was interesting to notice how this worked, for although there had been in the morning of the day of the visit paid to the school a very imposing funeral in the town, one of the largest that had ever been witnessed in the neighbourhood, it was found that in the whole school only four pupils had been absent, and although two of them brought notes of excuse from their parents these were not accepted as being sufficient. One absentee paid the fine, the others were put on the Black List for detention in lieu of fine. As to the regularity of attendance it is extremely good, for on examining the summary the following were the entries for the two preceding weeks.

Number on Books	675	681.
„ Present	641	656.
Average attendance	620·5	617.

Punctuality is secured by closing the doors promptly at nine and two o'clock, and admission after that time is impossible. Now and then it happens that a pupil is barred out, but not often, as of course it necessitates the payment of the absence fine, or entry on the Black List. Every child was in its place in the playground at the sound of the whistle on the day the writer was present.

It might be taken without saying that the tone of the school is all that could be desired. Corporal punishment is seldom resorted to, and then it is entirely in the hands of Mr. Johnstone. For the past half-year there has not been a case needing its exercise. No petty corporal punishments of any kind are ever permitted.

Mr. Johnstone attributes to a large extent the good feeling there exists between scholar and teacher, and the smoothness with which the whole of the school routine works, to the half hour devoted every morning to religious exercises, moral teaching, and the imparting of Bible knowledge. At nine o'clock the whole of the scholars and teachers assemble in the large room, and thus every day the pupils in every class come in contact, as it were, with the head-master and with each other. Thus the feeling is awakened that each forms a part of a great whole, and the opportunity is seized to enforce upon the pupils habits of order, forbearance towards one another, honour and truthfulness, and that thus only is the happiness and success of all ensured.

Mr. Johnstone has always strongly resisted any attempts on the part of the Wesleyan Conference, or any other body, to examine in religious knowledge, holding that to examine in it is impossible, and not only so, but extremely detrimental in its effect.

Still it must not be supposed that religious knowledge is not regarded by Mr. Johnstone as of great value, for he has frequently received from the Board of Examiners in connection with the Wesleyan Training College, high commendation for the very satisfactory manner in which his pupil teachers have acquitted themselves, three-fourths of whom have received the mark of 'excellent.'

That the results of the education given in this school have been highly satisfactory is shown by the number of scholarships gained in open competition by its pupils during the past year.

Of seventeen scholarships tenable at the Stockport Technical Schools, offered to girls in the schools in Stockport and district, eleven were obtained by the pupils from this school.

Of ten scholarships offered to boys six were won.

Of nine scholarships offered in commercial subjects, three were gained.

Thus, out of a total of thirty-six scholarships offered to all the schools in the district, Mr. Johnstone's pupils secured twenty.

Entrance scholarships to the Stockport and Manchester Grammar Schools have been granted to pupils from these schools from time to time.

At the Science Examinations in connection with South Kensington about eight hundred certificates for Physiography, Magnetism and Electricity, Chemistry, Hygiene, and Mathematics (Stages I. and II.), have been received during the nine years the classes have been in existence.

Two Science and Art scholarships are awarded each year. These are tenable in the school and have had considerable influence in retaining not only the holders but others at school much longer than otherwise would have been the case. In every instance the holders of these scholarships have done well. All have continued their studies in science after the scholarship lapsed, and about half of them have become teachers.

Besides the Science certificates, over 200 second grade Art certificates have been received, and it is of frequent occurrence that the pupil teachers, before completing their apprenticeship, have qualified themselves for the Teachers' Drawing Certificate in Freehand, Geometry, Model, and Perspective.

Mr. Johnstone has taken a very active and important position in regard to all professional associations and questions. He was one of the founders of the Wesleyan Teachers Association for the Manchester District some thirty years ago, and of which he has been president. He was also one of the

promoters of the Stockport and District Association of Elementary Teachers, of which he is the secretary. This association is one of the most successful in the country. It has on its rolls over 400 members. Its annual meetings have been addressed by some of the leading educationalists of the day, by Professor Adamson, of Owen's College, Knight of St. Andrews, Laurie of Edinburgh, Dr. Fitch, and others, and on subjects intimately and immediately connected with teachers. It was at one of these meetings that the first public pronouncement was made with respect to the establishment of day training colleges. Those who know how much of the success of any association depends on the spirit and energy shown by its secretary will appreciate and value highly the work Mr. Johnstone has done, and the high aims which have animated this association from its beginning are to be attributed to his enlightened conception of what an association should be, and of the influence it may exercise, not only in its immediate neighbourhood but on the general education of the country.

The action taken by the Cheshire County Council last year may partly be attributed to the work done by this and kindred associations.

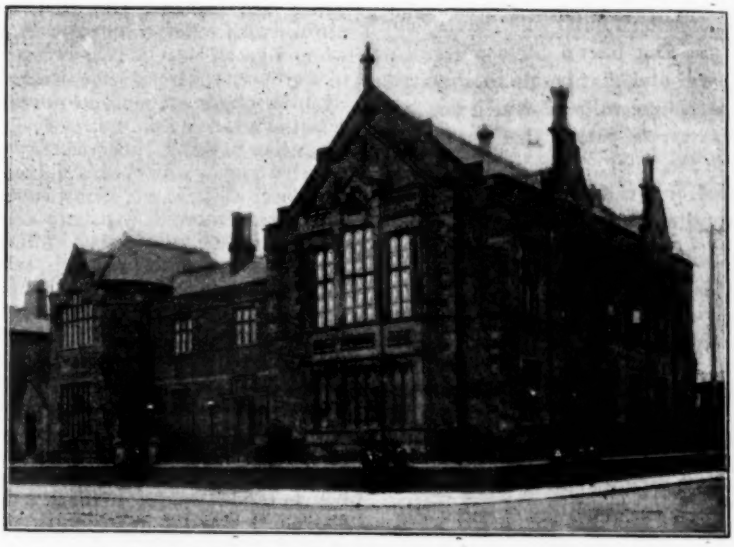
The Technical Committee of the Council consulted with the various associations in the county connected with the National Union of Teachers with a view to the extension of Technical Instruction, and the best means of employing the funds which had been placed at its disposal. The result was that a Cheshire Council of Teachers was formed, of which Mr. Johnstone is the President; and acting on the advice of this council, classes have been formed at various centres for the instruction of teachers, principally from the rural schools, in drawing, cookery and agriculture. The County Council has granted £1,000 to defray the expenses of these classes and to pay the class fees and railway fares of such teachers as were permitted to attend. Mr. Johnstone is the suprintendent of these classes in the Stockport centre.

At the Easter Conferences of the N. U. T. Mr. Johnstone has been a representative for many years, and in many ways has made his presence felt, and that in no small degree, by his genial manner, general courtesy and affability, and sound common sense.

From the formation of the Manchester and District Scholastic Trading Company Mr. Johnstone has been one of its largest shareholders, and for many years a valued and honoured director.

On his removal from Didsbury Mr. Johnstone determined to relinquish regular Sunday work. To this resolution he has adhered. However, many Sunday afternoons and evenings in the year are spent in addressing Sunday Schools in connection with the Wesleyan Methodist Society. He is also on the Chaplain's plan for attendance at the Great Stockport Sunday School.

The Science Teachers of the four Science Schools in Stockport have formed a committee, of which Mr. Johnstone is secretary, for mutual help and defence, in consequence of the issue of the circular from the Science and Art Department withdrawing the grants on Second Class Elementary Passes after the current year.



BRENTNALL STREET HIGHER GRADE SCHOOL, STOCKPORT.

Mr. Johnstone was, until it was taken over by the Town Council, an active member on the Committee of the Stockport Technical School, and since its foundation has rendered it great service by his practical knowledge and experience.

Without lofty aspirations success is seldom attained. In closing our remarks on the interviews Mr. Johnstone has so willingly granted us, we cannot but feel strongly impressed with the high ideal he has set before himself from the beginning of his career as to what an Elementary School should be. To reach his ideal he has laboured persistently and zealously; and as the Alpine climber, when he has reached the goal, rejoices and forgets the toil and difficulty of the ascent, so we trust Mr. Johnstone will long continue to derive pleasure from the results of his labours, and enjoy the confidence and esteem not only of those for whom he has laboured so ungrudgingly, but also of his fellow teachers, whose social status he has by his example raised, and whose scholastic burdens he has by his indefatigable labours helped to lighten.

The subject of our next sketch will be

Dr. FORSYTH,

Of the Central Higher Grade Schools, Leeds.

DECORATIVE NEEDLEWORK.

BY MAY MORRIS.

Colour.—Clear and beautiful colouring, sometimes complex, sometimes simple, is one of the principal features of fine embroidery. Some people are by nature more of colourists than others, and often hit upon the right method of work, while they would be puzzled if you were to ask them to explain the why and wherefore of it; but with others it is a matter of education, and a few general precepts founded on observation may be given for the benefit of those who are still feeling their way.

To the entirely uneducated eye (speaking with regard to colour) blue is blue, red is red, green, green, and so forth, every colour being positive, and there being no idea in the person's mind of the relation of one colour to another But after a little observation and experiment you will find that beside their positive value, colours have a relative value of which you have never dreamed hitherto; a colour that is in itself beautiful may become absolutely atrocious by awkward handling, being placed, for example, beside some other shade that is its natural enemy.

Of the colours principally used for embroidery, blue is one of the pleasantest to have constantly under one's eye, though personal idiosyncracies play an important part in colouring, and one person may declare against a generally admired colour without being able to explain the reason, though perhaps his doctor or his oculist could do so. Of blue choose those shades that have the pure slightly grey tone of indigo dye (varying, of course, somewhat on different materials). The quality of this colour is singularly beautiful, and not easy to describe except by negatives: it is neither slatey, nor too hot, nor too cold, nor does it lean to that unutterably coarse green-blue, libellously called 'peacock' blue; it has different tones—brilliant sometimes, and sometimes quiet—reminding one now of the grey-blue of a distant landscape, and now of the intense blue of a midday summer sky—if anything can resemble that. Pure blues, such as I am attempting to describe, are to be seen in the Chinese silks and satins, which are familiar now to most of us, sometimes very pale, and sometimes almost black in their intensity, but always full and brilliant. The modifications of this blue to purple and grey-purple on the one side, and to green-blue on the other, are also useful colours, used carefully.

Of reds, we have first a pure central red, between crimson and scarlet (for in the pure colour neither blue nor yellow should predominate), but this is a difficult shade to use; by far the most useful are those 'impure' shades which are modified by yellow, as, for instance, flesh-pink, salmon, orange, and scarlet; or by blue, as rose-pink, blood-red, and deep purple-red. The more delicate of such shades can be freely used where a central red, overpowering in its intensity, cannot. A warning, however, against abuse of warm orange and scarlet, which colours are the more valuable the more sparingly employed, and as dainty little spots of colour treasures indeed.

The most valuable colour next to blue is green, or, rather, equally valuable in its different way, being to some people more restful to the eye and brain. This being so, it is curious to remark how very rarely a good full green, neither muddy or coarse, is offered to the public. It is important for you to understand the different qualities of the various shades of green necessary for your work, for if you are told, or if you feel that such and such is an intrinsically admirable colour, you may perhaps through sheer enthusiasm try using it where it should not be used, or employ a certain shade in large masses that should be soberly dealt with, and so forth. Here again we see the force of the *positive* and *relative* value of colours: a cold, strong green, not in itself very pleasing, placed against a clear brilliant yellow, gathers depth and force which it would otherwise lack; a blue-green may strike the right note in a certain place, but if its use is exaggerated may blemish all. Now, there are certain greens which are brilliant and rich, and when employed broken with other colours produce a fine effect; but when a green is to be largely used, it should be chosen of a greyer, soberer shade, such as the eye rests on without fatigue. Avoid like poison the yellowish-brown green of a sickly hue that professes to be 'artistic,' and looks like nothing but corruption, and avoid also a hard metallic green, which, after all, would not easily seduce a novice, as it is very obtrusive in its unloveliness. For your embroidery-palette certain definite sets of green will be necessary; full, pure yellow-green, greyish-green, and blue-green, two or three shades of each. As aforesaid, the brilliant pure green that we admire in a single spring leaf is impossible to use in large masses, nor does Nature, whose all-pervading colour is green, give us these acute notes in unbroken mass. You have only to look at the effect of light and shade in a tree in full spring foliage, with the browns and greys of its twigs, to realise this fact; the great masses of green meadow-land, besides showing a variety of colour that may be overlooked in a careless glance, have a tenderness of tone that is quite beyond and above any possible imitation in art.

For a central yellow choose a clear, full colour that is neither sickly and greenish, nor inclined to red and hot in tone. Of impure yellows, pale orange, and a pink-yellow shade that inclines to copper are useful, besides the buff and brownish shades that will sometimes be wanted for special purposes. These, I think, include all the yellow shades that you need trouble about. A certain experience is wanted for the successful use of yellow, so those who take a special delight in the intrinsic beauty of this fine colour will do well to avoid too enthusiastic an introduction of it into their work. Of course, different colours and different dye-stuffs are affected by different materials. This is eminently the case with yellow: on wool, which absorbs the light, a large unbroken mass of yellow is positively forbidding, while with silk, with its lights and reflections that serve to break and 'grey' the colour, it is another matter.

Purple again is one of the 'difficult' colours with which we must, as it were, hit upon the exactly right tones to use. There are two valuable purples, a rather full red-purple, tending to russet, and a dusky grey-purple, which is, if the right tone is obtained, a very

beautiful, and if I may say so, poetic colour. Perhaps such colours belong more to the artist's palette than to the embroideress's set of wools or silks, but it seems to me there ought to be little difficulty in getting all manner of strange and charming shades out of the dyer's vats, if the dyer of commerce had the enthusiasm of his art.

Harmony, contrast and repetition, all these laws that we have glanced at with regard to form have the same application to colouring. In arranging your work, you should have in your mind a definite scheme of colour, as simple as possible at first, and consisting, perhaps, merely of one predominating colour with a few touches of another for a relief. When a little more experienced, you should still have some dominating colour or shades of a colour, among which contrasting tones are placed, bringing out the relative values according to your skill or instinct in choosing. For elaborate and costly work, it is obvious that gold and silver will form an important factor in the scheme of colour, but here again it must be noted that metals if employed in great masses, highly raised and without due relief and softening by colours, are apt to look hard and a trifle—sometimes more than a trifle—vulgar. For example, compare a late French or Spanish vestment of the richest description with one of the same kind made in one of the best periods of this art. Both are equally lavish in materials and workmanship; the former is probably a mass of thick padded and corded gold, sewn down with yellow or white silk on a rich white ground. While labouring by this piling up of metal to get all the effect of splendour he possibly can out of his materials, the craftsman has produced a piece of work smart enough for theatrical effect, or for a piece of pageantry, but giving no idea of splendid and sumptuous beauty, such as the faithful of all times have been desirous of surrounding their religion with, according to their abilities. But on the other hand, a similar work of art, wrought with similar aims, that is, to be a fit offering to a favourite saint, in whose benevolent personality the craftsman had a genuine belief, would have shown less vaunting of costly material—though none were stinted; but the cunning with which rich and brilliant colours were interwoven with gold would leave an impression on the eye of subtlety and fantasy that is one of the charms of the art. Some such work that I have in my mind has a flat, golden background, the surface broken by being worked in some simple zig-zag or waved pattern, needing far more 'technique' and delicacy than the lumpy gold of the late French or Spanish cited above. On this gold background will be placed subject groups from the lives of the Saints, perhaps, or rich fanciful ornament and foliage, wrought finely and laboriously with silk, with more gold, and possibly with little pearls and other precious stones. You don't want to have your high priest look as if he were cut out of tin-foil, but *clothed* in changeful folds that shine as he moves, and take lights and shadows on them like those of precious stones themselves. Such work, with its quality of mystery, had a living splendour, and was indeed 'fit for kings' treasuries,' as the simple saying has it, or as we might say nowadays, fit to gladden the eyes of all who believe that everything beautiful that is made, serves its due purpose in enriching the treasury of the world. I had no intention of raising the question here whether kings' treasuries or the treasury of humanity itself should have the privilege of possessing beautiful things, and, what is more, the power of enjoying them; but a belief in the power of beauty is a wholesome thing, and I make no apology for preaching it by the way. As an art, therefore, that should help to decorate home life very largely, and public life too, as regards religious buildings, public halls on festive occasions, and so forth, embroidery deserves to be taken seriously, especially the higher branch of it, which includes intricate colour and work in gold and precious stones, such as I have been speaking of.

It is not easy to give much advice about method in colouring, as I suppose everyone has his or her own pet way of setting to work. The colouring of your design can be treated as dark on a light ground, that is, using principally dark colours on a light ground; or, as light upon dark, using light colours on a dark ground—a more effective and more difficult treatment; or by placing colour upon colour, forming, as it were, a *mosaic* of colours of more or less equal tone. This last is an elaborate, but very beautiful method in which Eastern artists have always excelled, but it should be the last thing attempted by the student. A few hints as to grouping of colours to guard against fundamental errors will be all that is possible to touch upon here. As aforesaid, start with the simplest possible scheme of colour while you are feeling your way, and when you launch out into combinations of two or three colours, let one predominate, the others being rhythmically disposed to emphasise the leading tone. When you feel you can come to bolder contrasts, avoid placing a blue directly against a green of nearly the same tone; if blue and green are mixed, the blue must be very light against a dark green, or the reverse. Again, red and yellow, if both vivid, will need a softening line to separate them, though a pale yellow with a clear, pure, rather delicate scarlet is by no means a displeasing arrangement; or again, a full, clear yellow with a very pale brick-red. Red and green must be carefully chosen, aud softened by an outline; avoid much use of any cold green, especially avoid placing it against a misty blue, for the indecision and muddled effect of this arrangement is the reverse of pleasant. Brown must be carefully chosen, warm in tint, but not hot; a little of it will be necessary in figure-work, but for merely floral design a decided brown need be seldom used. Black also has distinct value in certain sorts of work, but the use of it should be left to an experienced hand. In handling colours, you must bear in mind the retiring quality of some and the assertive quality of others, but do not emphasise these qualities too much. Your work should, on the whole, be very flat and quiet in general character, though as bright as you can get it in the individual tones. As in design, avoid confusion and indistinctnesss of detail. The mystery and reticence spoken of with regard to work of the highest order is quite another quality, and one with which we have little to do here, beyond teaching ourselves to recognise and appreciate it. Make no attempt to grope after 'startling novelties,' but try for pure, clear tones. When people say they like 'soft, quiet colouring' in textiles and embroidery, it is an unconscious tribute to *harmonious* colouring, for the colours themselves, if excellent in quality, can hardly be too brilliant; if they appear so, it is the craftsman who is at fault.

(*To be continued.*)

STANDARD PROBLEMS.—STEP BY STEP.

With Blackboard Examples.

BY JOHN PENDLEBURY.

STANDARD V.

BEFORE proceeding to details, we would commend to the reader's careful consideration the general hints and remarks made in detailing with the work of the preceding standards. In a somewhat modified form they are applicable to the problematic work of Standard V., and the injunctions laid down as to *mental drill*, *concrete*, and *abstract examples*, *leading* from *easy* to *difficult*, etc., are just as imperative here, though repetition is unnecessary. The work of the previous standards has been considered as preparatory to the work of this, hence little if any introduction is necessary. Most of the work will of necessity involve the simple rules and the processes of thought and reasoning traversed in Standard IV. particularly. The chief feature in addition is the dealing with *Fractions* and *Fractional Parts*. As we suppose the theory of this to have been fully demonstrated and profusely illustrated by concrete examples during the ordinary arithmetical lessons in the earlier part of the year, it will be unnecessary more than to apply this knowledge in the best possible method in the correct solution of problems involving fractions. We shall not deal with ordinary Practice sums, or Bills of Parcels, or Rule of Three sums, except when necessary to the correct solution of the problems we take for illustrations. Write the following on the blackboard :—(1) If a man earns 6½d. per hour, in how many days of 9 hours each will he earn £2 16s. 3d.? Introduce by mental problems :—If I earn 3d. an hour, how long to earn 6d.? 2 hours. Why do we know that? Because 6d. is *two threepences*, and to earn *one threepence* it would take me *one* hour, therefore to earn *two* threepences I shall be *two* hours; in other words, it takes me *twice* as long to earn *twice* as much. Appeal to children's reason here. Proceed. If I get 6d. an hour, how long before I get half-a-crown? 5 hours. Why? Because there are 5 sixpences in 1 hour, and to earn 1 sixpence it takes 1 hour, therefore to earn 5 sixpences it *must* take 5 hours. If I earn 4d. a day, how long before I have got 5s.? How many *fourpences* have I to earn? How must we find that out? By reducing 5s. to *fourpences*, and *that* is the number of hours; OR, by reducing 5s. to *pence*, and dividing by *four* pence, to see *how many times fourpence* is contained in 5s. Thus on blackboard :—

5s.	5s.
3 fourpences, or	12 pence.
15 days.	4)60 pence.
	15 days.

The children will have no difficulty in seeing the necessity for the reduction to the same *coins* or *denominations*. Similar problems they will have mastered in Standard IV. Now in Problem I. we want first of all to see *how many* sixpence-farthings we have in £2 16s. 3d. What must we do first? Reduce both to farthings. 6½d. = 25 farthings. £2 16s. 3d. = 2,700 farthings. Divide 2,700 by 25 = 108, that is the man earns 108 sixpence-farthings; and if it takes him *one hour* to earn *one*, then it *must* take him 108 hours to earn the whole sum. Caution the scholars against writing *ans.* after the 108 hours, and concluding that the sum is finished. If there are 9 working hours a day, *how many days* will 108 hours make? 108 ÷ 9 = 12 days = Ans. Blackboard model :—

6½d.	£2 16s. 3d.	25)2700(108 hrs.	9)108 hrs.
4 fars.	20s.	25	12 days. = Ans.
25 days.	56s.	200	
	12d.	200	
	675d.	...	
	4f.		
	2700 fars.		

(2) A man put up 1 mile of fencing. What would be the expense if it was 2s. 9d. per yard, and labour was 1s. 2d. for every yard? It may be as well to ask what those words mean: 'labour 1s. 2d. for every yard.' It means that the cost of *erection* of the fencing was 1s. 2d. for every yard. Very little mental exercise will be needed for this problem. A man bought 5 dogs at 9s. each, and had to pay 1s. each to take them on the train with him. How much did each dog really cost him? 9s. + 1s. = 10s., and 5 dogs therefore cost 10s. × 5s. = 50s. = £2 10s. Fruit was sold at 19s. a basket, and the baskets were 1s. each extra. A man bought 10 baskets full. What did each basket really cost him? 19s. + 1s. = 20s. = £1. Their total cost was £1 × 10 = £10. Proceed to 2. What did fencing cost per yard? 2s. 9d., and 1s. 2d. for *putting up*, that is, each yard cost 2s. 9d. + 1s. 2d. = 3s. 11d. The first question which will inevitably crop up here will be, what number of yards did the man buy and erect? They will know that 1 mile = 1760 yards. Therefore total cost will be 3s. 11d. × 1760 = £344 13s. 4d. = Ans. They may be allowed to find this sum total either by *Multiplication* or by *Practice*, but the latter is preferable, as being more in the way of their ordinary work. Thus :—

£1760 @ 3s. 11d. each.

2s. of £1	1/10	176	0	0	cost at 2s. each.
1s. „ 2s.	½	88	0	0	„ „ 1s. „
6d. „ 1s.	½	44	0	0	„ „ 6d. „
3d. „ 6d.	½	22	0	0	„ „ 3d. „
1d. „ 3d.	⅓	7	6	8	„ „ 1d. „
1d. „ 1d.	1/12	7	6	8	„ „ 1d „
		£344	13	4	cost at 3s. 11d. each. Ans.

(3) A grocer gave 1 cwt. of sugar in exchange for 40 lbs. of cheese at 7d. a lb. What was the value of each lb. of sugar? Get the children to see clearly that the *money* value of the *sugar* given in exchange for the *cheese* must be the *same amount* as the *money value* of the cheese. What did the cheese cost? 40 lbs. at 7d. a lb. = 7d. × 40 = £1 3s. 4d. What is the value then of the *cwt.* of sugar? The same, viz., £1 3s. 4d. How many pounds in a cwt? 112. Then what will 1 lb. cost? Insist on the children invariably answering the one-hundred and twelfth part of £1 3s. 4d. How do you find that part? By division. £1 3s. 4d. ÷ 112 = 2½d. = cost of 1 lb. of sugar = Ans. Blackboard sketch :—

	d.	
7d.	112)280(2½	= cost of 1 lb. of sugar. Ans.
40 lbs.	224	
280d.	56	
	4	
	112)224(2	= ½
	224	
	...	

(4) James had ½, Arthur had ⅓, George had ¼, and William had the remainder. What part had he? Give a thorough drill in splitting *wholes* into parts, thus :—How many halves in 1 orange? 2; how many thirds? 3; how many fifths? 5; how many ninths? 9; how many twentieths? 20. The children will be very much interested to find, and will always remember the stern fact that two *halves* make a *whole one; three-thirds* make one *whole*, no matter what that whole may be, whether an orange, apple, cake, sum of money, or any other commodity, or simply an abstract number. Take several mental exercises, thus :—3 boys had a cake to divide between them. First took one-half, the second one-quarter; what was left for the third boy? How much did the *two* take away first? ½ + ¼ = ¾, and how many quarters are there in a *whole cake* or a *whole anything else?* 4. Then the third boy must take the remainder, which is 1 − ¾, or ¼ − ¾ = ¼. Now proceed to 4. The parts gone away are ½, ⅓ and ¼, that is 13/20. Now, from their knowledge of fractions we must draw from them that studying the fraction 13/20 we see that the *thing* has been divided into 30 parts (*denominator*), and that 21 of these parts (numerator) have been taken away by James, Arthur and George, and that there are therefore 9 parts (30 − 21 = 9) left for William, that is 9/30. It is much better always to give the answer to a fraction sum, *in its lowest form; insist* on this *always*. Thus :—9/30 = 3/10. = Ans., left for William. $\frac{1}{2} + \frac{1}{3} + \frac{1}{4} = \frac{5+6+10}{30} = \frac{21}{30}$.

$\frac{1}{1} - \frac{21}{30} = \frac{30-21}{30} = \frac{\frac{3}{9}}{\frac{30}{10}} = \frac{3}{10}$ Ans.

(5) A man bought three-quarters of a ton of sugar at £20 per ton, and sold it at 3½d. per lb. What did he gain on the whole? This only needs careful reading over. Caution against the catch, that he only bought (and therefore only sold) three-quarters of a ton, and that this did *not* cost him £20, but three-quarters of £20, which is £15. Now, how many pounds had he to sell? ¾ of 1 ton = ¾ of 20 cwt. = 15 cwt. = 112 lbs. × 15 = 1680 lbs.; and this is sold at 3½d. per lb., 3½d. × 1680 = £24 10s. Now, if *selling* price is £24 10s., and *buying* price is £15, the *profit* or *gain must* be

the *difference* between the two sums, that is £24 10s. — £15 = £9 10s. = profit. = Ans.

£ 20 × 3 = 60 → £15 buying price.

15 cwts. × 112 lbs. = 1680 lbs.

3½d. = selling price of 1 lb. × 1680 lbs. = 5040 + 840 = 5880d. = selling price of 1680 lbs.

12)5880d. = 20)490s. = £24 10s. " " " "

£	s.	d.	
24	10	0	selling price.
15	0	0	buying price.
9	10	0	profit. = Ans.

(6) A coal train contains 19 waggons. If the weight of each waggon with its load is 12 tons, and the weight of each waggon when empty is 5 tons 1 cwt. 3 qrs. 17 lbs., what weight of coal is in the whole train? Deal first with *one* waggon. Thus:—Waggon + coal = 12 tons = 26880 lbs. Waggon = 11413 lbs. Therefore real weight of *coal* in *one* waggon = 26880 lbs. — 11413 lbs. = 15467 lbs. Now, there are 19 waggons, therefore total weight = 15467 lbs. × 19 = 293873 lbs. = 131 tons 3 cwts. 3 qrs. 13 lbs. Ans.

12 tons × 20 cwts. = 240 cwts. × 112 lbs. in 1 cwt. = 480 + 240 + 240 = 26880 lbs. in 12 tons

5 tons 1 cwt. 3 qrs. 17 lbs.
20 cwts. = 101 cwts. × 4 qrs. = 407 qrs. × 28 lbs. = 3273 + 814 = 11413 lbs.

26880 = waggon + coals.
11413 = waggon.
15467 = coals.

15467 lbs. coals in 1 waggon × 19 waggons = 139203 + 15467 = 293873 lbs. in 19 waggons.

lbs. 28 { 7)293873 lbs. ; 4)41981 + 6 } 13 lbs. = 131 tons 3 cwt. 3 qrs. 13 lbs. Ans.
qrs. 4)10495 + 1
cwts. 20)2623 + 3 qrs.
131 + 3 cwts.

Typical Problems for Tests.—The foregoing examples are sufficient as indicating the method of procedure to be followed in all cases. The following may be worked out before the class in a similar way, preceding each by similar but *easy* mental exercises. The letters following each example indicate the steps, and have the same meaning, as in the previous standards. (1) A grocer buys sugar at 2¼d. per lb., and sells at 24s. per cwt. What does he gain on a ton? (2¼d. × 112. S.M. by 20 = £3. Ans.) (2) A grocer bought a quantity of chicory at 4d. per lb. and coffee at 5d. What did he gain on the following transaction, in which 6 lbs. of coffee and 1 lb. of chicory were sold as a mixture at 1s. 4d. per lb.? (5d. × 6 = 2s. 6d. 4d. × 1 = 4d. 2s. 6d. + 4d. = 2s. 10d. 1s. 4d. × 7 (6 lbs. + 1 lb.) = 9s. 4d. 9s. 4d. — 2s. 10d. = 6s. 6d. Ans.) (3) A sailor gave a coat worth 19s., and 3 vests worth 5s. each, in exchange for some bacon at 8d. per lb. How many lbs. of bacon were there? (19s. + (5s. × 3) = 34s. = 408d. 408 ÷ 8 = 51 lbs. Ans.) (4) How many apples at 10d. a dozen ought to be given for 100 pears at 1½d. each? (1½d. × 100 = 12s. 6d. = 150d. D. by 10d. = 150 doz. = 180. Ans.) (5) How many eggs at 14 for 1s. ought I to give in exchange for 7 lbs. of lard at 8d. per lb. and 8 lbs. at 6½d. per lb. (8d. × 7 = 4s. 8d. 6½d. × 8 = 4s. 4d. 4s. 8d. × 4s. 4d. = 9s. + 14 × 9 = 126 eggs. Ans.) A lady's income is £7 per week. She spends £64 5s. per quarter. What does she save per year of 52 weeks? (£7 × 13 = £91. £91 — £64 5s. = £26 15s. M by 4 = £107. Ans.) (7) A man drinks a bottle of wine a day. How much will it cost him a year at £1 12s. per doz. bottles? (£1 12s. ÷ 12 = 2s. 8d. M by 365 = £48 13s. 4d. Ans. (8) A potato merchant bought 75 bushels of potatoes for £6. A quarter of them were bad, and he sold the rest at 4½d. per gallon. How much did he gain? 75 bush. = 75 × 8 = 600 gals. ¼ of 600 = 150. 600 — 150 = 450 gals. left. 4½d. × 450. S. £6 from it. £2 8s. 9d. Ans. (9) 240 oranges are bought at 8d. per dozen, and sold at 2 for 1½d. Find the gain. (240 ÷ 12 = 20. M 8d. by 20 = 160d. 240 ÷ 2 = 120 at 1½d. = 180d. S. = 20d. = 1s. 8d. gain. Ans.) (10) A girl takes 100 steps, each 1 ft. 6 in. long, in 1 minute. How long would she be walking 1 mile 4 furlongs? (1 ft. 6 in. × 100. D. 1 mile 4 furlongs by it. This gives number of minutes as 52⅔. Ans.) (11) If from a cheese ⅓ were sold on Monday, ¼ on Tuesday, and ⅛ on Wednesday, how much of it would then remain? (Add, then take rem. from 1.) (12) Find the total weight of the pennies in £2,000 when 5 pennies weigh 2 ounces (R. £2,000 to pence, D. by 5, M. by 2, then R. to lbs., etc. = 5 tons 7 cwts. 16 lbs. Ans.) (13) If a man had $\frac{9}{10}$ of an acre, and sold ⅗ of an acre to one person and ¼ to another, what fraction of an acre had he left? ($\frac{9}{10} - (\frac{3}{5} + \frac{1}{4}) = \frac{3}{20}$. Ans.) (14) A man spends £2 18s. 4½d. a day for 365 days, and saves £50 12s. 6d. What is his yearly income? (M. and A. £1,115 19s. 4½d. Ans.) (15) If one fire burns 47 lbs. and three others burn 21 lbs. each in a day, how long will 44 tons last? (21 × 3 = 63 + 47 = 110. R. 44 tons to lbs. D. by 110 = 896 days. Ans.) (16) A gentleman bought an equal number of melons at 4½d. and 5d. each. They cost him £1 11s. 8d. altogether. How many did he buy? (4½d. + 5d. = 9½d. R. to halfpence and ditto with £1 11s. 8d. D. by 2 = 40. Ans.) (17) A man rides 9 miles 1,080 yards on a bicycle. The large wheel is 4½ yards round and the small wheel 8 ft. How many more turns does the little wheel make than the larger one? (R. to feet. D. by one circumference and also by other. S. = 2,585 times. Ans.) (18) I have a certain sum of money to give away, and find that I can give 120 boys 2s. 1½d. each. How many boys could I give 1s. 6d. each with the same money? (2s. 1½d. × 120. Reduce to pence, then divide by 18d. = 170 boys. Ans.)

CONVERSATIONAL DRAWING LESSONS FOR INFANTS.

BY MRS. E. MORTIMER,

Author of Practical Kindergarten Lessons for English Infant Schools; Lecturer on the Kindergarten at the Home and Colonial Training College.

THE longer horizontal lines, 4 and 5 squares long, are now given to the children to draw, and these are followed by combinations of the different lengths, 1 to 5 squares long.

The following is a lesson on the eighth pattern of the last series (XV.).

The teacher must be provided with a chequered blackboard and the children with drawing-books and lead pencils.

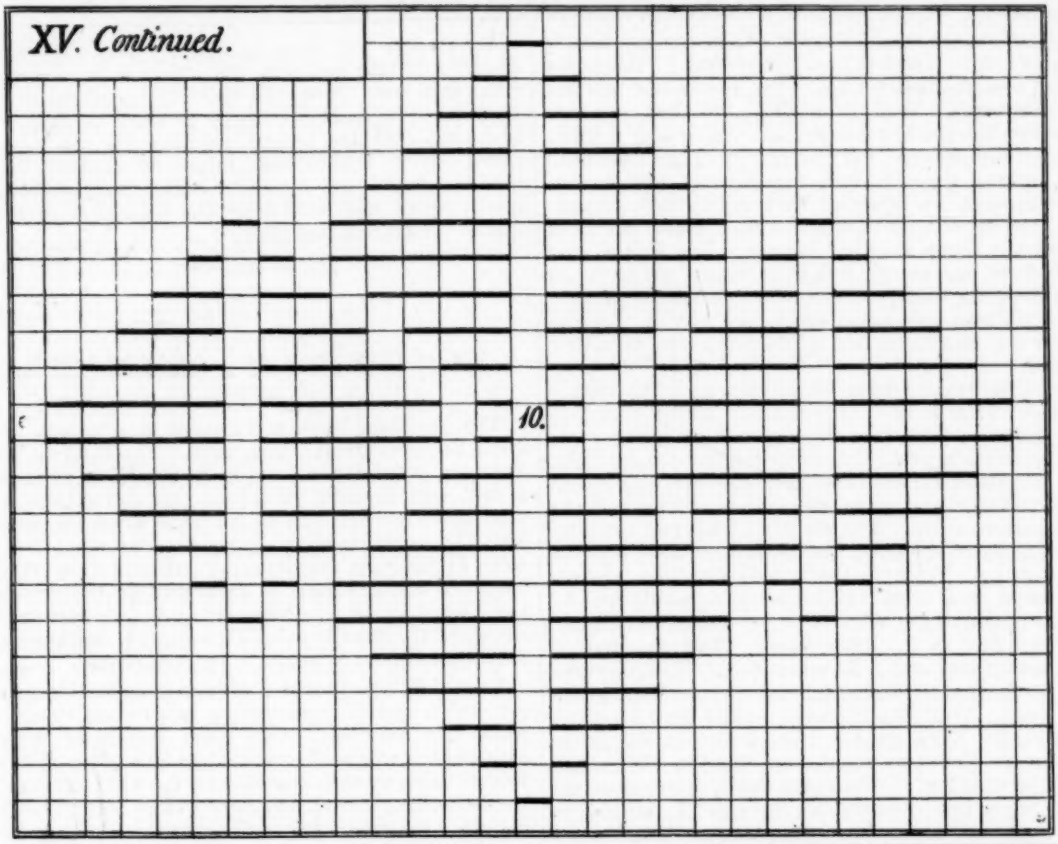
Children to be questioned about the last drawing copy they did. What kind of lines they are now drawing. Tell them they are going to draw horizontal lines again to-day.

Now, children, look at the board and count the squares I touch. How many? Seven. What have I done on the top of the next square? Drawn a line. What kind of line? How long is it? Now you may draw a horizontal line 1 square long, the same as mine. How many squares must you count from the end? Very well; now, watch me again. What have I done? Drawn a line. Where? Underneath the other. How long? Three squares long. Where does it begin? One square to the left of the first. And where does it leave off? One square to the right. Now, you draw a line like that. Now, I want to draw a line 5 squares long under that one. Where shall I begin it? One square to the left. And where shall I leave off? One square to the right. Very good. Now, draw the line very carefully.

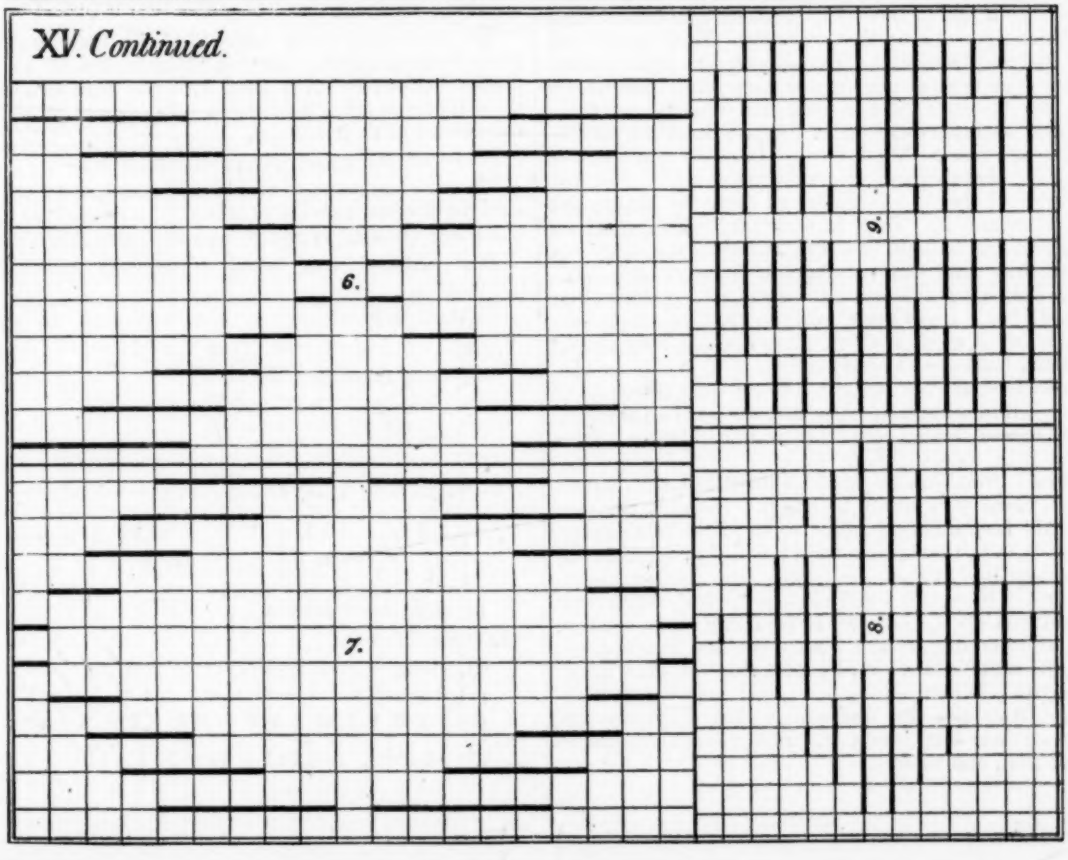
Under that you may draw another line five squares

XV. Combination of different lengths 1 to 5 squares.
1. See N° VIII, adding lines of 4 and 5 squares.
2.
3.
4.
5.
XIII. Horizontal lines 4 squares long.
1.
2.
3.
4.
7.
5.
6.
8.
XIV. Horizontal lines 5 squares long.
1.
Exercises similar to XIII should follow.

XV. Continued.



XV. Continued.



long. Now, see what I have drawn under my line, 5 squares long. Another line. How long? Have you drawn one like that before? Yes, the second line was just the same. Well, draw that, and then you may draw one like the first one you did. How long is that? Look at my pattern; tell me how long the lines are? One square, three squares, five squares, five squares, three squares, one square. Very good; look at your own, and see if your lines are right. Have you ever drawn a pattern like that before? Yes, I think you have done one exactly like it, so we are going to do something else to-day—this is only a part of our pattern. Have you ever seen anything like it? Well, Tommy thinks it is something like a humming-top, without a handle.

Now, see what I have done. Drawn a line under the last. How long? One square. Under that you may draw one three squares long, then under that one five squares long; under that another, five squares long, then one three squares long; and then one, one square long. Well, what have we done? Made just the same pattern again. Yes, we have made two patterns, one underneath the other; but we have not yet finished our drawing. Point to the second line, five squares long, that you drew. Now put your pencil on the second square to the left. Now see what I have done. Drawn a line on it. How long? Now you draw a line, one square long, in the same place. Now, that line is to be the top of another pattern; who can draw the next line? Well, Mary, you come and draw it on the blackboard. Very good. How long has she made the line? You may all do one like it. Who can draw the next line? Very well, John, you may come. How long is it? You may all do one. I think now you might all try to finish the pattern. Where does the bottom line come? On the same line as the third line five squares long that we drew. How many lines are there underneath? Three—one five squares, one three squares, and one one square. And how many are there above? Three—one five squares, one three squares, and one one square. Do you think the pattern is finished now? Well, Fanny, what do you think it wants? Another pattern on the other side. Yes, that is right. I should like Fanny to show me where she would begin it. That is very nice. You must all point to the second line five squares long that you drew, then miss one square, and draw on the next. Now I should think you can finish that pattern. You may all try. I will draw mine so that you may look at it to see if yours is right. You must be very careful that the lines are all nicely drawn.

Now look at your pattern. What does it look like? A large humming-top. Yes, it looks just like the little pattern you made, only this is much larger. How many little ones are there?

Now I think you might draw another large pattern. I will show you where to begin. Look at the part you did last, and now point to the lines five squares long. Count two squares from the right end, and then draw one line five squares long; now another underneath it. Now, can you finish that part? Well, how would you do it, Harry? Draw a line three squares, and another one square, above the line five squares, and the same below. Which part will you draw next? The top. Where will you begin? At the bottom. Yes. Draw the line one square long, then the one three squares long above it, and the line five squares above that, and so on.

What part will you do next? Yes, the pattern underneath that one, and then the one on the right-hand side last. Now, you have two patterns drawn. How many squares are there between them? Yes, the parts that are nearest together are two squares apart. Now I think you might do another. The teacher should watch the children throughout the lesson to see that they draw the lines very carefully and to the best of their ability.

(*To be continued.*)

—o—

RECENT INSPECTION OF A CHESHIRE SCHOOL.

THE Assistant Inspectors arrived at 9.15 a.m.; the Head Inspector came a little later. The children were arranged in three divisions, A, B, C. Each child had a card tied in front of it; on this was printed the schedule number. The names were arranged on the schedule according to the group they were in; if they were in different standards for different subjects, the Inspector allowed them to be drafted to the standard they were to be examined in, *e.g.*, In Group B., Standard II., three boys took Standard I. Arithmetic—they were sent to Standard I. for Arithmetic.

Each child was provided with an examination paper, pen, ruler, and blotting-paper; this caused things to work very smoothly. One great feature of the examination is that a class should be able to sit perfectly still when no work is provided for it. One section had 'to do nothing' for three-quarters of an hour. Another division sat from 11.30 till 12.10 without having anything set them.

The inspectors were very kind in their manner towards the children, and the 'long-looked-for examination' closed at 12.30 a.m., with the best wishes of the scholars and teachers that a good report might be the reward of their labours.

Below are the details of the examination:—

We were requested to divide each standard into three sections of equal average proficiency. One section took Reading; another Writing; and the third Arithmetic.

The *Singing* was taken three days before the inspection.

Division II.:—

(1) 1 : 1 | 1 :— | 1 :— ‖

(2) Modulator exercise.

(3) A song—'The Coral Insect.'

Division III.:—

(1)

1 : 1	1 : 1	1 : —	1 :—
1 :	1 :	1 : 1.1	1 :—
1 : 1	— : — ‖		

(2) Modulator exercise.

Division IV.:—

(3) Song—'Soft, Soft Music is Stealing.'

(1) d m s f m r d s ^{s}d t$_{1}$ d m r d ^{d}s f m s l t d'

(2) l t d' t l se l t d' l r' d' t l d' t l se l

(3) | 1 :— | : | 1 : 1 | 1 : — 1 | 1 : 1.1 | 1 :— ‖

Song—'Cuckoo.'

Reading.—Expressive reading was required in Standard III. In the upper standards the reading was from unseen passages. Each child was questioned as to the meanings of the words that had just been read. The requirements in this subject seemed to have increased since last year's examination.

Writing.—Standard I. had a paragraph to write from their reading book.

Standard II. had dictation from the 'Geographical Reader.'

STANDARD III.

Boys.—'This is St. Paul's. It is a vast building, but it is so surrounded by warehouses and shops that it is hard to realise how large it is. The best way is to enter, and then its size grows upon you. To describe it would take a volume. You must, therefore, visit it as often as you can.

'Many great men have been buried there. Observe the monuments on the walls and in the chapels, which we find along the sides.'

Girls.—'When the canes are ripe the sugar harvest begins. The work in the West Indies is done by negroes, who are sent out with bills to cut down the canes. These are cut into pieces about a yard long, and tied into bundles; then in waggons drawn by oxen they are taken off to the sugar mill. Here the canes are crushed between iron rollers until all the sweet juice is squeezed out.'

STANDARD IV.

Unseen passage from a School Magazine.

'How enormous is the space of ground which a single mole covers with its network of roads and galleries, driven in every direction from the fortress, and sunk at various depths, according to the state of the ground and the position of the worms! Sometimes it burrows along just at the surface of the ground, its back visible as it passes along, and so making a shallow trench rather than a tunnel. Sometimes, as in very dry weather, it is obliged to dive deeply into the earth before it can find the worms.'

STANDARD V.

The boys had Dictation.—The piece contained these words: 'facilities, library, stinted, enable, instructive, imagine, course, maintained, recreation, entertaining, thrown, animated, sight, restriction.'

The girls had Composition.—The story was 'The Wonderful Umbrella.' It was read twice by the Inspector.

STANDARDS VI. AND VII.

Boys.—Write a letter about 'Any book you have read.'

Day's work in school.—Essays on Iron, Railway Station, a Locomotive Engine.

All the girls in these standards took Composition.—The subjects were: Bread, Tea, Coffee, Sugar, Milk.

Arithmetic.—

STANDARD I.

Take 527 from 716.

$$\begin{array}{r} 75 \\ 160 \\ 538 \\ 2 \\ 450 \\ \hline \\ = \end{array}$$

STANDARD II.

Boys.— 9,587 × 971
31,405 ÷ 8
11,055 − 7,084

Girls.— 8,406 × 739
90,910 ÷ 6

8,409 + 572 + 80,064 + 79,319 + 80 + 34,700

STANDARD III.

Cards contained a long division, compound addition, compound subtraction, and a problem. The following are types of the problems:—

1. A cow and a calf cost £29 10s.; the cow cost £19 0s. 10d. How much more did the cow cost than the calf?

2. There is a row of thirteen houses; each contains nine windows; each window has twelve panes. How many panes are there altogether?

3. A girl had 10,986 beads; she sold one-half of them. How many had she left?

STANDARD IV

£83 17s. 2½d. × 59.
£723 18s. 5d. ÷ 25.
Reduce 4¼ acres to square inches.
If a window had 28 panes of glass and 36 square inches for each pane, what would the glass cost at 3d. per square foot?
£397,465 4s. 5½d. ÷ 386.
Bring half a ton to stones.
Bring 3,960 farthings to £ s. d.
I bought 32 pairs of gloves at 1s. 6d. per pair, and sold them at 1s. 9d. per pair. How much did I gain?
£9,843 16s. 4d. ÷ 79.
Multiply £4,676 17s. 11½d. by 704.
How many acres in 44,679 square inches?
A foreman had £63 4s. 7½d., he paid 19 men £2 14s. 3d. each. How much had he left?
Standard IV. were allowed 45 minutes to do the Arithmetic.

STANDARD V.

760 articles at £1 9s. 11½d each.
$\frac{4}{5} - \frac{1}{8} + \frac{3}{8}$.
A potato merchant bought 8 bushels of potatoes for £1 19s. 4½d. He lost 4 bushels 2 pecks of them, and sold the remainder at 10½d. per peck. What did he lose by the transaction?
64 acres 2 roods 20 poles at £10 10s. per acre.
How far can I travel for 18s. 6d., if I can travel 156 miles for 19s. 6d.?
A grocer bought 5 cwt. of sugar for £4 13s. 4d. He sold it at 2½d. per lb. How much did he gain on the whole?
$\frac{5}{6} + \frac{7}{12} - \frac{3}{4}$.
A grocer bought 14 lbs. of tea at 4d. per lb., and 16 lbs. of tea at 4½d. per lb. He mixed them. How much a lb. was the mixture?
Each card contained a Bill.

STANDARD VI.

Bring the sum of ·375 of £ + 1·125 of £5 + ·75 of 5s. to the decimal of a £.

$$\frac{3\frac{3}{5}}{\frac{4}{5}} + \frac{3\frac{1}{8} - \frac{1}{8}}{\frac{3}{8} + \frac{5}{8}}$$

Simple interest on £523 18s. at 5 per cent. for 1½ years.

Twenty men can dig 80·32 tons. What number of men can dig 105·232 tons?

(3061·7234 + 401·2672) ÷ 2364.

In what time will £300 become £486, at 5 per cent.?

A person owned $\frac{8}{11}$ of a ship and sold $\frac{8}{12}$ of it for £260. What was the rest worth?

Standard VII.

What amount of 3 per cent. stock at 90 must I have to produce an annual income of £135?

$\frac{5}{6}$ acre + $\frac{1}{3}$ sq. pole − $\frac{1}{11}$ sq. pole.

In a school of 450, 90 per cent. were presented for examination; 6·6 per cent. of these failed. How many passed?

Find the average cost per lb.

18 lbs. of tea at 3s. 6d. per lb.
17 " " " 3s. "
15 " " " 2s. 6d. "
19 " " " 4s. "

If the population of a town on January 1st 1887 was 240,000, and the birth-rate for the year is 25·75, and the death-rate 20·25 per thousand, what is the population on January 1st, 1888?

Divide £100 among three persons in the proportion of 2:15:3.

In the class subjects, at least one-half of the standard was examined in each. The teacher was requested to examine the Mental Arithmetic. In the upper standards great stress was put upon the knowledge of the principles by which the sums were worked.

Grammar.—This was done on paper throughout the school.

Standard II.

Each child had a reading book; the Inspector marked a paragraph. This had to be written out. One line had to be drawn under the nouns and two lines under the verbs.

Standard III.

Each child had a separate sentence marked in the reading book. This had to be written out word by word in a vertical column, and the parts of speech written opposite to each word.

Standard IV.

A similar course was adopted. The following are a few of the marked pieces for parsing:—

'The life of these sons of nature is one long picnic.'
'He has much to do in a country like Queensland.'
'Good roads in a new country are very scarce.'
'Some of these roam over the prairies.'
'The lake is studded with pretty islets.'
'The crew of one of the boats was killed.'

Standard V.

Three pieces chosen for analysis:—

(*a*) 'The vast dominion ruled over by the Queen of England is more than twice the size of Europe.'

(*b*) 'But England is anchored at the side of Europe, and right in the heart of the modern world.'

(*c*) 'We buried him darkly at dead of night,
The sods with our bayonets turning.'

Standards VI. and VII.

(*a*) *Analyse:* 'The hope of clearing himself with them, too, and explaining how he had been forced away, had kept him up and sustained him under many of his recent trials.'

(*b*) *Analyse:* 'This light bursting on a certain person, who, on the instant approached towards it through the gloom, expressed the whole thing to him in a twinkling.'

Standard II.

Geography.—What is that region of land round the middle of the earth called?
What is Australia?
Give parts of a continent?
To what country do we belong?
What is an iceberg?
In what ocean do we find icebergs?
Difference between Arctic and other oceans? (Frozen.)
Where do rivers rise?
Which is the widest part of a river?
What kind of soil is it in a desert?
Questions as to meaning of a rock, sea-coast, capes, etc.

Standard III.

What does England form part of?
Where are the British Isles?
What is the boundary on N., E., S., W.?
What other mountains branch off from the Cheviot Hills?
What rivers rise in the Pennine Chain?
What river separates Northumberland and Durham?
Name a town on the River Tyne.
For what is Northumberland noted?
What is Newcastle noted for?
What coalfield is it the centre of?
What towns at the mouth of the Tyne?
What river divides Durham from Yorkshire?
What river drains Yorkshire?
Name any tributary of the Yorkshire Ouse.
What other Ouse do you know in England?
On which tributary is Leeds?
What is Leeds noted for?
What is Yorkshire divided into?
In which of the Ridings is the Woollen Manufacture carried on?
Name any town employed in the manufacture of wool.
What river runs through Staffordshire?
What is the district in North Stafford called?
What is made there? Why called earthenware?
Name a town on the Trent.
Where is the Black Country? What made there?
What should I see being made at Birmingham, if I went? (Steel goods were required.) What are they made of?
Why not iron? How is iron made into steel?
What is made at Nottingham?
Name the chief fishing port? Where do they obtain the fish? Is Doggerbank to W. or E. of England?
By what railway could I get from Leicester to Sheffield?
What do they do with the fish?
By what railway will they send them?
What is made at Leicester?
By what railway will they be sent away?

STANDARD IV.

In which continent is Canada?
Provinces in Canada?
Chief towns in provinces?
What do you know about Ottawa?
What is Nova Scotia?
Which is the chief town?
What part is it?
What is Newfoundland?
What is it to us?
Is fishing a dangerous work? Why?
Which is the chief town?
What small island is by Newfoundland?
Towns on St. Lawrence.
What is the chief employment in Canada?
What is lumbering?
How would you get from the Pacific to Hudson's Bay? What railway would you go by?
What sort of a country is Scotland?
What are the mountains divided into?
Highest mountain in the Grampians.
Most important river.
What is Balmoral noted for?
Village near it.
What is made in Glasgow?
Towns on the Tay.
Which is nearer—Glasgow or Port Glasgow to the Firth of Clyde?
Boundaries of Scotland.
Lakes on Caledonian Canal.
Where are ships made?
What is Dundee noted for?

STANDARDS V., VI., AND VII.

In what continent is the United States?
Boundaries.
Why did the United States separate from England?
How many States originally? Now?
What cannot a representative from a Territory do that one from a State can?
Government of States.
Where is Washington?
Why so called?
New York.—Island close to it.
Can it get any larger?
A town on Long Island.

Questioned on Statue of Liberty, mountains, Mormons, cities, mining districts, rivers, Pilgrim Fathers, industries (pork packing especially), Mississippi, agriculture, ports on Gulf of Mexico, climate of New Orleans.

Questions on currents of Atlantic Ocean—
Why do currents flow in a westerly direction?
The maps were United States, Atlantic Ocean, Pacific Ocean.
One-half of each Standard was chosen to do a map.
The different maps were given in rotation.
A did United States;
B Atlantic Ocean;
C Pacific Ocean.

Needlework.—Each girl did this exercise. It was taken in the same order as the specimens are noted in the Code. Girls were lettered A, B, C, etc., and did the work corresponding to these letters in the Code.

Recitation.—The meanings were especially noted.

Copy Books were not asked for.

INFANTS (Average 200).

BABIES.

Letters and figures on slates from memory.

Kindergarten.—Bead-threading, needle-threading, form and colour.

FIVE-YEAR-OLDS.

Addition and subtraction of tens, no borrowing.

A sentence was written on the blackboard to be copied.

Sewing.—Three inches of hemming.

Kindergarten.—Drawing and weaving.

The teacher gave an object lesson, mental arithmetic lesson, and an exercise in Tonic Sol-fa.

SIX-YEAR-OLDS.

Addition and subtraction of hundreds, without borrowing.

Five inches of hemming and twelve rows of knitting got ready for them.

FIRST STANDARD.

Reading was taken from the two sets of Readers.

Drawing was selected from Miss Warmington's Drawing Book.

Kindergarten.—Drawing and cubes.

Sewing.—Seam and fell with two colours of cotton.

They had to cast on twelve loops for knitting; knit twelve rows, cast off.

Each teacher gave an object-lesson, and exercised their class in Tonic Sol-fa.

INFANT SCHOOL (Average 90).

STANDARD I.

First Row: Reading.
Second Row: Arithmetic.
Third Row: Transcription.

Kindergarten.—One-half did 'pricking.' The other half did 'embroidery.'

Class 1.

One-half: Transcription.
The other half: Arithmetic.
First row took Reading.

Kindergarten.—Half the class did 'matting.'

Class 2.

One-half wrote the words 'Light,' 'Might.'
The remainder took Arithmetic—
(1) 22 + 31 + 46.
(2) 47 − 25.

Word-building was taken, *e.g.*, hop, shop; ill, mill, etc.

Kindergarten.—Gift III.

Object-lesson on orange-tree.

In the Babies' class one-half wrote the small letters m, p, t, l, i.

The other half copied figures from the blackboard.

LA JEUNE SIBÉRIENNE.

TRANSLATED BY PROFESSOR DARQUÉ—*(Author of 'Pupil Teachers' French Course.')*

La Jeune Sibérienne.

La lettre de Mme. de G°°° était adressée à une personne qui logeait[331] de l'autre côté de la Néva. Comme l'adresse en était bien détaillée, Prascovie, quelques jours après le départ du marchand, se mit en chemin avec son hôtesse pour Wassili-Ostrow.[332] Mais la Néva était ébranlée,[333] la débâcle des glaces approchait,[334] et la police ne permettait plus le passage. Elle revint donc au logis, désolée de ce contre-temps. Dans l'embarras où elle se trouvait, un des habitués de la maison du marchand lui conseilla, très-mal à propos, de donner une supplique au Sénat pour obtenir la révision du procès de son père, et s'offrit de trouver un écrivain pour la rédiger. Le succès de celle qu'elle avait adressée au gouverneur de Tobolsk la décida. On lui fit écrire une supplique très-mal conçue et n'ayant pas la forme requise, sans lui donner la moindre[335] notion sur la manière dont elle devait être présentée. Ce projet ne lui permit pas de remettre avec l'activité[336] nécessaire ses lettres de recommandation, qui auraient pu lui être bien plus utiles.

Munie de sa supplique, notre intéressante solliciteuse se rendit un matin au Sénat, monta le grand escalier, et pénétra jusque dans une des chancelleries; mais elle se trouva fort embarrassée parmi tant de monde, ne sachant à qui s'adresser. Les secrétaires dont elle s'approchait avec sa supplique lui jetaient un coup d'œil et se remettaient[337] froidement à écrire; d'autres personnes qui la rencontraient dans la chambre, au lieu de l'écouter et de recevoir sa supplique, se détournaient d'elle, comme on ferait d'un meuble ou d'une colonne qui barre[338] le chemin. Enfin un des invalides, gardes de la chancellerie, qui traversait rapidement la salle, l'ayant rencontrée, se détourna sur la droite[339] pour passer, tandis que Prascovie en faisait autant du même côté pour lui faire place, de manière qu'ils se heurtèrent rudement.[340] Le vieux garde, de mauvaise humeur, lui demanda ce qu'elle voulait. La jeune fille lui présenta sa supplique, en le priant de la donner au Sénat. Cet homme, la croyant une mendiante, pour toute réponse la prit par le bras et la mit à la porte. Elle n'osa plus rentrer, et demeura le reste de la matinée sur l'escalier, dans l'intention de présenter sa supplique au premier sénateur qu'elle rencontrerait. Elle vit plusieurs personnes descendre de voiture[341] et monter l'escalier, ayant des étoiles[342] sur la poitrine[343]: elles avaient toutes une

The Young Siberian.

The letter of Mrs. de G. was addressed to a person who lived on the other side of the Neva. As the direction was given with full particulars, Prascovie, a few days after the departure of the merchant, set off with her hostess for Wassili-Ostrow. But the ice on the Neva had begun to give way, the melting of the ice had begun, and the police no longer allowed people to cross. She, therefore, returned home, grieved by this mishap. In the perplexity in which she was, one of the frequent visitors at the merchant's house most improperly advised her to present a petition to the Senate in order to obtain a revision of her father's trial, and undertook the task of finding a writer to draw it up. The success of the one she had sent to the governor of Tobolsk induced her to do so. They made her write a very improperly-worded petition, which was not in the required form, without giving her the slightest idea as to the manner in which it ought to be presented. This project did not allow her to deliver with the requisite promptitude her letters of introduction, which might have been far more useful to her.

Provided with her document, our interesting petitioner went one morning to the Senate, ascended the main staircase, and got as far as one of the chancery offices; but she was very much puzzled among so many people, not knowing whom to apply to. The secretaries, whom she approached with her petition, cast a glance at her, and coolly resumed their writing; other persons who met her in the room, instead of listening to her and taking up her petition, turned away from her, as one would *avoid* an article of furniture or a column that stood in one's way. At last a pensioner, one of the guards of chancery, who was quickly crossing the hall, having met her, turned to the right in order to pass, whilst Prascovie was turning to the same side to make room for him, so that they came into collision. The old guard, out of temper, asked her what she wanted. The young girl presented her petition to him, and begged him to deliver it to the Senate. That man, thinking she was a beggar, by way of answer took her by the arm and turned her out (of doors). She no longer dared to go in again, and stayed the remainder of the morning on the staircase, with the intention of giving her petition to the first senator she should meet. She saw several persons alight from their carriages and go up the staircase, wearing orders on their breasts: they all

Notes.

(331) *Logeait.* This verb is now no longer used in reference to persons who live in their own house.

(332) *Wassili-Ostrow*, the island of Basil.

(333) *La Néva était ébranlée.* The pontoon bridges are removed during the winter, so it was no longer possible to cross to the other side till they were set up again.

(334) *Approchait*, literally 'was drawing near.'

(335) *La moindre idée. Petit*, small, little, has also the regular comparative and superlative *plus petit* and *le plus petit;* the regular form is used in reference to physical things, the irregular one for abstract ones.

(336) *Activité* might here be rendered by 'diligence.'

(337) *Se remettaient*, literally 'began again.'

(338) *Barre*, stops, as with a bar.

(339) Notice: *tournez à droite*, turn to the right; *sa maison est à droite*, his house is on the right (-hand side).

(340) *Se heurtèrent*, literally 'knocked against one another.'

(341) *De voiture.* In expressions of this kind the French never use the possessive adjective, nor do they ever put the noun in the plural when each of the persons alluded to is supposed to have, or use, at the time only one of the persons or things represented by the noun: *ils ont perdu la vie*, they lost their lives; *elles ont retrouvé leur mari*, they found their husbands again.

(342) Some decorations are star- (*étoile*) shaped.

(343) *Poitrine*, literally 'chest.'

épée, des bottes[344] et un uniforme; quelques-unes avaient des épaulettes. Elle pensa que c'étaient des officiers et des généraux, attendant[345] toujours de voir arriver un sénateur, qui, d'après l'idée qu'elle s'en était formée, devait avoir quelque chose de particulier qui le ferait reconnaître et n'offrit sa supplique à personne. Enfin, vers trois heures après midi, tout le monde s'écoula, et Prascovie, se voyant seule, se retira la dernière, fort étonnée d'avoir vu tant de monde au Sénat sans rencontrer un sénateur. A son retour, elle fit part de son observation à la marchande, qui eut beaucoup de peine à lui faire comprendre qu'un sénateur était fait comme un autre homme, et que ceux qu'elle avait vus étaient précisément les sénateurs auxquels elle aurait dû remettre sa supplique.

Le lendemain à l'heure de la rentrée du Sénat, elle se trouva sur l'escalier, et présenta son écrit à tous les arrivants pour ne pas manquer les sénateurs, sur la nature desquels il lui restait[346] encore quelques doutes; mais personne ne voulut le recevoir. Elle vit enfin arriver un gros monsieur avec un cordon rouge, un uniforme rouge, une étoile de chaque côté de la poitrine, et l'épée au côté. 'Pour cette fois, se dit à elle-même la solliciteuse, c'est un sénateur, ou il n'y en a point dans le monde!' Elle s'approcha de lui et lui présenta son papier, en le suppliant de vouloir bien lui donner cours: comme elle barrait le chemin, un laquais du sénateur l'écarta doucement du passage; et son maître, croyant qu'elle demandait l'aumône, lui dit: 'Dieu vous bénisse[347]!' et monta l'escalier.

Prascovie retourna pendant plus de quinze jours au Sénat sans obtenir plus de succès. Souvent, fatiguée de rester debout dans un escalier froid et humide, elle s'accrouipissait sur une des marches pour réchauffer ses pieds glacés,[348] cherchant dans la physionomie des passants et des employés quelques signes de compassion et de bienveillance, qu'elle y aurait certainement trouvés s'ils avaient connu sa situation.

Telle est la constitution de la société dans les grandes villes: la misère et l'opulence, le bonheur et l'infortune se croisent sans cesse, et se rencontrent sans se voir; ce sont[349] deux mondes séparés qui n'ont aucune analogie, mais entre lesquels un petit nombre d'âmes compatissantes, marquées par la Providence,[350] établissent des points rares de communication.

Un jour, cependant, un des employés, qui l'avait sans doute remarquée précédemment, s'arrêta près d'elle, prit la supplique, et sortit de sa poche un paquet de papiers. La malheureuse conçut un instant d'espoir; mais le paquet était une somme d'assignations, parmi lesquelles il en prit une de cinq roubles, la mit dans la supplique, et, rendant le tout à la suppliante, rentra dans l'appartement et disparut. Prascovie, toute déconcertée, serra l'assignation et se retira. 'Je suis sûre,

wore a sword, boots and a uniform; a few had epaulets. She thought that they were officers and generals, always expecting to see the arrival of a senator, who, from the likeness she had fancied, was to have something peculiar *about him* whereby she should recognise him and *so* she did not offer her petition to anyone. At last, towards three o'clock in the afternoon, everybody went away, and Prascovie, seeing herself alone, was the last to withdraw, very much surprised to have seen so many people at the Senate without meeting with a senator. On her return she communicated this remark to the merchant's wife, who had much difficulty in making her understand that a senator was made like any other man, and that those she had seen were precisely the senators to whom she ought to have delivered her petition.

The next day at the time of meeting of the Senate, she took her station on the staircase, and presented her written document to everyone that came, in order not to miss the senators, about whose identity she had still some doubts; but nobody would take it. At last she saw *the arrival of* a stout gentleman with a red ribbon, a red uniform, an order on each side of the chest, and a sword at his side. 'This time, the petitioner said to herself, this is a senator, or there is none in the world!' She drew near to him and offered him her paper, entreating him to deliver it: as she stopped the way, one of the senator's footmen gently put her aside; and his master, thinking she was asking for alms, said to her: 'God bless you!' and went up the staircase.

Prascovie returned for more than a fortnight to the Senate without obtaining more success. Often, tired with standing on a cold and damp staircase, she squatted on one of the steps to warm her cold feet, watching the faces of the passers-by and *employés* for some signs of compassion and benevolence, which she certainly would have found there had they been aware of her situation.

Such is the constitution of society in large towns: misery and wealth, happiness and misfortune continually pass one another, and meet without seeing each other; they are two separate worlds which have no analogy, but between which a small number of compassionate souls, marked out by Providence, establish rare meeting points.

One day, however, one of the *employés*, who had doubtless previously noticed her, stopped close to her, took the petition, and brought out of his pocket a bundle of papers. The unfortunate girl had a glimpse of hope; but the packet was a bundle of banknotes, from among which he took one worth five roubles, put it in the petition, and giving the whole back to the supplicant, entered the apartment and disappeared. Prascovie, quite disconcerted, put the banknote in her pocket and withdrew.

(344) *Bottes*, here 'riding-boots.'

(345) *Attendre*, if used without any object, is rendered by 'to wait.' *Attendez ici*, wait here.

(346) *Il lui restait encore des doutes* might be translated more literally by 'some doubts still remained in her mind.'

(347) *Dieu vous bénisse.* The words *je désire que* are understood before.

(348) *Glacés*, here 'as cold as ice.'

(349) *Ce sont.* Whenever *ce* is the subject of the verb *être* and is immediately followed by a third person plural, the verb is also put in the third person plural; thus we say: *c'est nous*, it is we; *c'est vous*, it is you; *c'est vous et vos amis*, it is you and your friends; but *ce sont eux*, it is they. There are few exceptions to this rule.

(350) *Marquées par la Providence* might most appropriately be rendered by 'chosen by Providence.'

disait-elle un jour à son hôtesse, que si un frère de Mme. Milin se trouvait parmi les sénateurs, il aurait pris ma supplique sans me connaître.'

Les fêtes de Pâques, pendant lesquelles le Sénat ne s'assemble[351] pas, lui donnèrent quelque repos: elle en profita pour faire ses dévotions. En se livrant à ce pieux exercice, elle renouvela ses prières pour le succès de son entreprise; et telle était la sincérité de sa foi, qu'après sa communion[352] elle revint persuadée qu'on prendrait sa supplique au Sénat la première fois qu'elle s'y présenterait; ce qu'elle n'hésita point d'annoncer à la marchande comme une chose certaine. Cette dernière était bien loin de partager son espérance, et lui conseilla d'abandonner cette voie[353]: cependant, comme le jour[354] de la rentrée du Sénat, elle avait des affaires au quai Anglais, voyant Prascovie s'acheminer à pied, elle lui offrit de la conduire en droschky.[355] 'Je ne sais, lui dit-elle en chemin,[356] comment vous n'êtes pas découragée de tant de démarches inutiles! À votre place, je laisserais là le Sénat et les sénateurs, qui ne feront jamais rien pour vous; c'est tout comme, ajouta-t-elle en lui montrant la statue de Pierre le Grand qui se trouvait près d'elle, c'est tout comme si vous offriez votre supplique à cette statue que voilà: vous n'en obtiendrez rien de plus.

— 'J'espère, répondit Prascovie, que ma foi me sauvera. Aujourd'hui je ferai ma dernière démarche au Sénat, et l'on prendra sûrement ma supplique: Dieu est tout-puissant: oui, ajouta-t-elle en descendant du droschky, Dieu est tout-puissant et peut, si telle est sa volonté, forcer cet homme de fer à se baisser[357] et à prendre ma supplique.' La marchande, à ces mots, fit un grand éclat de rire, et Prascovie, revenue de son enthousiasme, en rit elle-même; cependant elle n'avait exprimé que sa pensée.

Tandis qu'elle examinait la statue, sa compagne lui fit observer que le pont de la Néva, qui était tout près, était replacé; des voitures sans nombre se rendaient à Wassili-Ostrow et en revenaient. 'Avez-vous la lettre de recommandation pour Mme. de L^{000}? lui demanda-t-elle; je ne suis pas pressée, et je puis vous conduire à sa porte.' Il était de bonne heure encore, et Prascovie y consentit. Elles passèrent le pont: le fleuve, qui n'était quinze jours auparavant qu'une plaine de glaçons mouvants, dégagé maintenant de toutes ses neiges et couvert de vaisseaux et d'embarcations de toute espèce, la surprit agréablement. Tout était en mouvement autour d'elle; le temps était superbe; elle sentait redoubler son courage, augurant[358] bien de la visite qu'elle allait faire. 'Il me semble, dit-elle en embrassant sa conductrice, que Dieu est avec moi et qu'il ne m'abandonnera pas.'

'I am positive, she said one day to her hostess, that if one of Mrs. Milin's brothers were among the senators, he would have taken my petition without knowing me.'

The Easter holidays, during which the Senate did not meet, afforded her some rest: she availed herself of them to fulfil her religious duties. While attending to that pious duty, she renewed her prayers for the success of her undertaking; and such was the sincerity of her faith that after having partaken of the Lord's Supper she came back convinced that the Senate would receive her petition the first time she should appear before them; which she did not hesitate to tell the merchant's wife as a positive fact. The latter was very far from sharing her hopes, and advised her to give up that means: however, as on the day of the reassembling of the Senate, she had some business on the English Quay, seeing Prascovie start on foot, she offered to take her in her droschky. 'I do not know, she said to her as they went along, how you have not been disheartened by so many useless steps! *Were I* in your place, I should let the Senate and senators alone, who never will do anything for you; it is just as, she added while showing her the statue of Peter the Great which was near her, it is just as if you were offering your petition to the statue that you see there: you will get nothing more by it.

— 'I hope, Prascovie replied, that my faith will save me. To-day I shall go for the last time to the Senate, and they will assuredly receive my petition: God is almighty: yes, she added, alighting from the droschky, God is almighty and can, if such is His will, compel that iron man to stoop and take my petition.' The merchant's wife burst out laughing at those words, and Prascovie, having recovered from her enthusiasm, laughed at it herself; yet she had only expressed her thought.

While she was examining the statue, her companion made her notice that the bridge on the Neva, which was close by, had been set up again; numberless carriages were going to Wassili-Ostrow and coming back again. 'Have you the letter of introduction for Mrs. de L.? she inquired of her; I am in no hurry, and I can take you to her door.' It was early yet, and Prascovie consented. They went over the bridge: the river, which a fortnight before was only a plain of moving pieces of ice, now freed of snow and covered with ships and boats of every description, was a pleasant surprise. Everything was moving around her; the weather was splendid; she felt her courage increase, as she conceived great hopes from the visit she was going to pay. 'It seems to me, she said, embracing her conductress, that God is with me and that He will not forsake me.'

(351) *S'assemble.* The present indicative is frequently used instead of the past in reference to events that are still taking place at the time of speaking or writing.

(352) The Greek and Roman Catholic churches have a commandment whereby all good Catholics are enjoined to partake of the Sacrament every Easter.

(353) *Voie*, literally 'way.'

(354) *Le jour.* The French never translate the preposition 'on' frequently found in English before expressions of time.

(355) *Droschky*, a Russian four-wheeled carriage.

(356) *En chemin*, on the way.

(357) *Se baisser* is here equivalent to 'to come down from his pedestal.'

(358) *Augurant*, literally 'auguring.'

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NEW COMPOSITION STORIES.—STANDARD V.

Suitable for 'Unseen Tests' in Reading also.

No 101.

PRESENCE OF MIND.—Gonsalvo, who died in 1515, was one of the most renowned men of his time, and one of the most noble and unselfish. His bravery was unquestioned and unflinching, and his presence of mind in great emergencies proverbial. Once upon a time, when a dangerous mutiny had broken out among his troops, a stout soldier, who had been designated to assassinate the chief, approached him, and suddenly made a thrust at him with a spear. He lightly and adroitly lifted the weapon aside, mildly saying as he did so: 'Have a care, my brother; you came near injuring your general.' Whereupon the man was so ashamed, and so moved with the sense of the enormity of the crime he would have committed, that he sank upon his knees in tears, and begged his chieftain's pardon, which was granted at once; and thus the mutiny was nipped in the bud.

No. 102.

THE OLD MAN'S LOVE.—A century ago, in the north of Europe, stood an old cathedral, upon one of the arches of which was a sculptured face of wondrous beauty. It was long hidden, until one day the sun's light striking through a slanted window revealed its matchless features. And ever after, year by year, upon the days when for a brief hour it was thus illumined, crowds came and waited eagerly to catch but a glimpse of that face. It had a strange history. When the cathedral was being built, an old man, broken with the weight of years and care, came and besought the architect to let him work upon it. Out of pity for his age, but fearful lest his failing sight and trembling touch might mar some fair design, the master set him to work among the shadows of the vaulted roof. One day they found the old man asleep in death, the tools of his craft laid in order beside him, the cunning of his right hand gone, his face upturned to the other marvellous face which he had wrought—the face of one whom he had loved and lost in early manhood. And when the artists and sculptors and workmen from all parts of the cathedral came and looked upon that face, they said: 'This is the grandest work of all; love wrought this!'

No. 103.

HOW THE PARROT SAVED THE KITTEN.—A parrot and a kitten, which lived in the same house, were great friends and used to play together. One day they were playing 'touch,' when the kitten aimed a blow at the parrot, that knocked her off her perch into a big tub of water that stood close by, but the force of the blow was such that pussy was also carried with it into the tub. Both creatures went under, but the parrot was equal to the occasion. Grasping with one claw the edge of the tub, with the other she seized her playmate, lifted it out of the tub, and sent it to the floor with a shove that shook a lot of water out of its skin. The odd thing about this was, that the parrot was not quite sure how the kitten would regard her friendly action. At all events, she flew into her cage for a while, in order to be out of the reach of her claws.

No. 104.

A DOG STORY.—Last Friday a handsome St. Bernard presented itself at the gate of Nunhead cemetery. He was alone, and the gate-keeper tried to prevent him entering, but he baffled him, and made his way to the highest-priced part of the cemetery, and lay down in a spot which he has occupied almost continually since. The cemetery officials have done all they can to coax the dog away, but without success. He has at night moved to where he might find water to drink, and possibly food, which over-particular beggars may have thrown within the railings. But he has soon gone back to his secluded spot, and there he remains.

No. 105.

THE BITER BITTEN.—An Indian chief being on a visit to Sir William Johnson, said to him one morning at breakfast, 'Last night me dream you give me fine suit of soldier's clothes.' Now, Sir William well knew that Indian etiquette required either host or guest to make over anything thus indirectly begged. So the coveted uniform forthwith changed owners. Some months afterwards the chief repeated his visit. And now came Sir William's turn to dream. *He* dreamt that his guest freely gave him a large tract of land, over the price of which they had long been haggling. On hearing the dream the chief solemnly replied, 'The land is thine, but we no dream any more.'

No. 106.

A RAILWAY ON THE TOPS OF TREES.—I daresay many of you have wondered why the cradle in the nursery song was placed 'on the tree-top,' but you will be more surprised to hear of a railway running across the tops of trees. Yet there is such a railway in existence, and it will be found in California. At a spot near the coast there is a deep ravine, over which a way for the trains had somehow to be made. To build a bridge of stone or iron being too costly it was determined to utilise the trees. The top branches were sawn off at the level of the banks, and the timbers for the line were laid on the stumps. Two gigantic trees that stood in the middle of the ravine gave a first-rate central support, and they were cut at a height of seventy-five feet above the bed of the river. This tree railway-bridge is said to be quite safe, and is justly regarded as a wonder.

No. 107.

KINGSLEY AND THE BUTTERFLY.—As everybody knows, Charles Kingsley loved well 'both man, and bird, and beast.' This feature in his character was curiously displayed one Sunday in church. He was just about to enter the pulpit to preach his sermon, when all of a sudden he disappeared from the view of his congregation. What was amiss? It was soon seen, however, that nothing serious had happened. He had only stooped in search of something on the floor, which, when found, he had taken to the vestry. And what was this something, do you think? An injured butterfly, which was fluttering about on the ground. Being unable to fly away owing to its hurt, Kingsley was afraid it might be trodden on, and so he had interrupted the service in the church until he had removed the wounded insect out of harm's way.

No. 108.

THE CAT AND THE RAT.—A rat, seeing a cat approaching, and finding no means of escape, went boldly up to her, and said—'Madam, I have just swallowed a powerful dose of poison, and in accordance with the instructions upon the label, have come out of my hole to die. Will you kindly direct me to a spot where my corpse will not prove peculiarly offensive?' 'Since you are so ill,' replied the cat, 'I will myself transport you to a spot, which I think will suit you.' So saying, she struck her teeth through the nape of his neck, and trotted away with him. This was more than he had bargained for, and he squeaked shrilly with the pain. 'Ah!' said the cat, 'a rat who knows he has but a few minutes to live never makes a fuss about a little pain. I don't think, my fine fellow, you have taken poison enough to hurt either you or me.' So she made a meal of him. This fable teaches us that we make no profit out of lying.

No. 109.

A TRAVELLER once journeyed along a narrow path, on one side of which rose a high mountain, and on the other side a wide and deep river flowed. Suddenly he saw a fierce tiger rush down upon him from the mountain. In order to escape the danger, he was just about to jump into the stream and to swim for his life, but at that moment a crocodile darted up his head from the river and opened his jaws to devour him. The poor traveller sank powerless to the earth with fright, not knowing what to do, for death stared him in the face on both sides. The tiger now made a spring at him, but went over his head into the open jaws of the crocodile. The two beasts now struggled in the water, and the traveller went on his way rejoicing at his happy deliverance.

No. 110.

WHY PICNICS ARE SO CALLED.—Everybody knows what a picnic is, but most folks would find it hard to say how it got that name, and yet it is simple enough when you come to learn about it. When a picnic was being arranged for, the custom originally was, that those who intended to be present should supply the eatables and drinkables. A list of these necessities having been drawn up, it was passed round, and each person *picked* out the article of food or drink that he or she was willing to furnish, and the name of the article was *nicked* or ticked off the list. Thus the name of pick and nick. The custom is said to date from 1802, so it is wholly an institution of the 19th century.

No. 111.

CHARMED BY A SNAKE.—One summer morning a little girl left her father's house to gather blackberries near a spring. Not returning at the expected time, her mother went to look for her. The child was not at the spring, nor did she reply when her name was called out loudly several times. Passing through the bramble bushes, the mother was horrified to see her child seated on a rock, with a rattlesnake in her lap. The odious thing was waving its head to and fro, and almost touching the little girl's lips. So perfectly was the child fascinated by the hideous creature, that she never heard

her mother's shriek, although it reached her father, who was a quarter of a mile off, and brought him instantly to the spot. As soon as he appeared, however, the snake showed signs of fight, and loudly shook its rattle. When the father approached it, the girl fell back in a faint, and the reptile struck her on the right thumb, and then sprang at her father, who fortunately slew it with a stone. Her father then sucked the wound, and probably saved his daughter's life. The girl said she was picking berries when she saw the snake, and was unable to move when she looked at it; but she was not afraid, and when the reptile waved its head to a fro in her face, she only felt as if she was going to sleep.

No. 112.

THE DOG AND THE RAVEN.—A dog, finding a joint of mutton apparently guarded by a negligent raven, stretched himself before it with an air of intense satisfaction. 'Ah,' said he, 'this is salvation to my stomach—an instrument upon which I love to perform.' 'I beg your pardon,' said the raven, 'it was placed there specially for me by one who has the right to do so.' 'I do not doubt that,' replied the dog, 'but I must not provoke a breach of the peace by relinquishing what I might feel it my duty to acquire by violence. I must think about it, and in the meantime I will dine.' He did so, then shut his eyes, yawned, turned upon his back, thrust out his legs, and died. The meat had been carefully poisoned, a fact of which the raven was guiltily conscious. There are things mightier than brute force—poison is one of them.

No. 113.

SIR CHRISTOPHER WREN AND THE CARPENTER.—A certain village carpenter named Wood, who had developed an uncommon skill in wood carving, in the hope of improving his circumstances went to London, where he sought work in vain. The huge dome of St. Paul's Cathedral was just then nearing completion. Wood applied to the foreman for work in carving the wood for the interior. Repulsed by him, he haunted the place day after day, till at last he attracted the notice of Sir Christopher himself. 'What have you been used to carving?' said the architect. 'Troughs, your worship.' 'Troughs?' said Sir Christopher. 'Then carve me a sow and pigs as a specimen of your skill—it will be in your line—and bring it to me this day week.' The poor fellow shrank away from the laughter of the workmen, and returned to his lodging in despair. But his landlady advised him to take Sir Christopher at his word, and carve the best sow and pigs he could. With his last guinea he bought a block of pear wood, finished his work, and took it under his apron to the appointed place. Upon inspecting the work, Sir Christopher said, 'I engage you, young man; attend at my office to-morrow.' Then he added, 'I fear I did you some injustice; but a great work is entrusted to me, and it is my duty to see that no part of the work falls into inefficient hands.' It is a pleasure to know the young man did much of the carving of St. Paul's.

No. 114.

THE HEDGEHOG AND COCKROACHES.—An old lady's kitchen was overrun with cockroaches. They devoured her shoes, got themselves mixed up in the soup—in short, made themselves as obnoxious as they possibly could. She determined to rid herself of the nuisance, and, having taken advice, purchased a hedgehog, and gave instructions that the prickly beast should be located in the basement that very evening. She was a kind lady, and provided for the creature's comforts by a large basin of bread and milk. In the night she crept downstairs to ascertain the result of her experiment. She found the hedgehog rolled up, sleeping in the fireplace, whilst the hospitable cockroaches appeared to be entertaining all that ever could have existed of their species at a supper, consisting of the bread and milk provided for their intended annihilator. That hedgehog is now for sale.

No. 115.

A BRAVE KANGAROO.—A very pathetic story comes from Australia describing a kangaroo's daring for the sake of her young. The owner of a country station was sitting one evening on the balcony outside his house, when he was surprised to see a kangaroo lingering about, alternately approaching and retiring from the house as though half in fear and doubt what to do. At length she approached the water-pails, and taking a young one from its pouch held it to the water to drink. While her baby was satisfying its thirst, the mother was quivering all over with excitement, for she was only a few feet from the balcony on which one of her great foes was sitting watching her. The little one having finished drinking, it was replaced in the pouch, and the old kangaroo started off at a rapid pace. When the natural timidity of the kangaroo is taken into account, it will be recognised what astonishing bravery this affectionate mother betrayed. The gentleman was so affected by the scene that from that time forward he could never shoot at a kangaroo.

No. 116.

A FOX'S REVENGE.—A gentleman residing on the banks of the Hudson River, on one occasion went out for a day's shooting. When he came to the river he saw six geese beyond shot. He determined to wait for their approach to the shore. While sitting there, he saw a fox come down and stand some time watching the geese. At length he turned and went into the woods, and came out with a large bunch of moss in his mouth. He then entered the water very silently, sank himself, and, keeping the moss above water, floated among the geese. Suddenly one was drawn under, and the fox soon appeared on the shore with the goose on his back. He ascended the bank, and found a hole made by the tearing up of a tree. In this he placed the goose and covered it with great care, strewing leaves over it. The fox then left, and while he was gone the hunter unburied the goose, closed the hole and resolved to await the issue. In about half an hour the fox returned, accompanied by another. They went to the place where the goose had been buried and threw out the earth. The goose could not be found. They stood regarding each other for some time, when suddenly the second fox attacked the other most furiously, as if offended at the trick of his friend. While they were fighting the gentleman shot them both.

No. 117.

A SPOILED HAT.—A Bristol lady was informed by her servant-girl that a box of flowers had been left at the door for her. Being occupied at the time, the lady told the servant to open the box, sprinkle the flowers with water, and put them on the ice, adding that she would attend to them when she went down to tea. The box really contained a new Spring hat which had been ordered, but was forgotten at the time the servant reported the arrival. Only the flowers were seen when the box was opened. The servant followed her orders implicitly, and the flowers were so thoroughly drenched that the hat became a limp and worthless mass of discoloured ribbons and straw.

No. 118.

A SLY FOX.—A sly old fox, seeing some hens roosting with chanticleer in a courtyard, endeavoured to beguile them with fine words. 'I have good news to tell you,' said he—'namely, that the animals have held a great council, and sworn to perpetual peace. Come down,' he continued, 'and let us celebrate this peace with our friendship.' The cock, more crafty than Master Reynard, raised himself upon his spurs, and took a survey all round. 'What see you?' said the fox. 'I see two dogs coming this way.' Reynard instantly takes to flight. 'Stop, Stop!' cried chanticleer. 'Do you not say that peace has been proclaimed among animals?' 'Yes,' said the fox, 'but perhaps yonder dogs have not yet heard the news.'

No. 119.

A STORY OF BRAVERY.—The following pathetic incident occurred at the time of the wreck of the Advance at the mouth of the Tyne recently. After the boat was launched, Captain Osbourne stood to his post like a true British sailor, directing each man to his position in the boat so that she should not capsize. Not until he saw his crew all safely in did he attempt to enter and save himself, and then, upon hearing someone say the cat was in the cabin, he got out of the boat again and went into the cabin, flooded with water, and brought out the cat, saying as he re-entered the boat: 'Now, lads, I think we are all here; you may shove off.'

No. 120.

THE REWARD OF AVARICE.—The only sailor who perished in the Kent Indiaman was present in the hold very shortly after the commencement of the fire which destroyed the vessel, when, availing himself of the confusion, he hastened to the cabin of the second mate, forced open a desk, and took from thence 400 sovereigns, which he rolled up in a handkerchief and tied round his waist; but in attempting to leap into one of the boats he fell short, and the weight of the gold caused him immediately to sink.

No. 121.

A FORTUNATE DREAMER.—One summer night, a few years ago, a man named Davis had a dream about a part of the country he had long thought of visiting. Every detail of the vision was very clear, and the whole was strongly impressed upon his mind. He saw in his dream a thickly-wooded ravine and a miner looking for gold. A stream ran by, and after a while it forked. Just at this point a man (who was himself) came to a ridge of yellow ore. He used hammer and chisel, and there was no mistake about the value of the chips. Davis awoke and went about his business. Two other nights in succession he had the same curious dream. Then he started off with two companions to the district which he had previously talked of exploring. They were unsuccessful at first, but suddenly they came upon a ravine exactly like that in the dream. Every feature was the same except the ridge of gold. They had to dig here as elsewhere, but presently their efforts were rewarded by a big nugget.

NEW DICTATION TESTS.

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STANDARD IV.

No. 81.

Owing to the continuance of the terrific gale, the three imprisoned keepers at the lighthouse, up to last evening, had not obtained relief. Mountainous seas dashed against the rock, and the relief boat dared not go out to their assistance. The men are now three weeks overdue, and some anxiety prevails ashore, but it is believed they are well, and are suffering no great privation, though they are reduced to tinned meat and ships' biscuits. Ashore last night much damage was done, sheds being unroofed and windows blown in.

No. 82.

To those who have to help others bear a great affliction I would say, Follow their lead, and do not try to manage them your own way, but be ready to help. To some, exertion is impossible, to others it is a relief. Some find comfort in talking, others cannot bear to speak; some are active and alert, just excited enough to think of everybody and everything, and really not able to feel at all, till all the bustle has subsided.

No. 83.

An eminent physician says that the Indian tea which is being cultivated has become so powerful in its effects upon the nervous system that a cup of it taken early in the morning so disorders the system that those who take it actually get into a state of tea intoxication. If you want to have tea which will not injure and which will refresh, get black China tea, putting in the right measure—the old-fashioned teaspoonful for each person, and one for the pot. Then pour on briskly, boiling water, and within five minutes you must pour it off again, or it will become wicked instead of good.

No. 84.

A terrible explosion of gas, resulting in loss of life and the destruction of valuable property, occurred yesterday afternoon in a block of buildings. It was a few minutes to four o'clock when the explosion occurred. The report could be heard half-a-mile away. Scarcely a shop in the centre of the town escaped damage. Windows were smashed by the hundred, and the shopkeepers thought the shock was the result of an earthquake. The Crown Hotel, a very large building, and the shop adjoining, were levelled to the ground by the explosion, which occurred in the hotel.

No. 85.

We have a marvellous application of machinery whereby the ease and cheapness of the work are vastly increased; but, after all, the principle of our most elaborate looms does not greatly differ from that of the simplest cottage spinning-wheel. It is amazing how the old art of weaving has entered into the thought and language of the Bible, and of all books that enshrine for us the life of long ago. People could not help seeing how well it illustrated the ways and fortunes of men, and the chances and changes of their lives. The yarn or thread was a man's life, and its pattern or shape was what was made of it.

No. 86.

The Persians have long been famous for their skill in weaving. Their carpets, shawls, felts, cotton and woollen goods have for centuries gained them a name for excellence of design and texture, which is now only giving way before the advance of modern improvements. Their silken fabrics are of the richest and most gorgeous kind. They excel in dyes—no doubt owing to the pure atmosphere—and are well-noted for their embroidery.

No. 87.

They found her wedged under a heavy beam; she had apparently been smothered, and was just breathing her last as they reached her. It was a very anxious time, for the workers knew that the adjoining building might fall upon them at any moment. At half-past ten the men were still removing the wreckage, and the fire brigade were playing upon the smouldering ruins.

No. 88.

Owing to the terrific gales off the coast of the Isle of Man, relief cannot be afforded to the three men in charge of the Rock Light. Tremendous seas are dashing over the rock, and one of the men, who should have come ashore a fortnight ago, is now that time overdue. The men are believed to be all well, and the relief boat is kept in readiness, but cannot get out in consequence of the continuous gales. The fresh provisions of the men have been exhausted, and the latter are reduced to tinned meats and ship's biscuits.

No. 89.

The bear is not a social animal, but is quite content to live in the solitude of the forest. They have one curious custom. During the summer, when food is plentiful, they lay in a large stock of fodder, and grow enormously fat. When winter arrives, and provisions grow scarcer, they retire into a hollow tree, or a cavern, and then fall into a deep sleep, during which they consume their fat, and out of which they seldom come till the following spring. The bear is a devoted mother. Woe betide the man who comes near her cubs, for she will fight till her last breath.

No. 90.

On the Lancashire and Yorkshire Railway great damage has been done by the violent gale. Signal posts have been blown down. At one place a post fell across the telegraph wires and stopped communication by their medium. At another place the cover of a shed has been blown on to the line, and has impeded the traffic. Several houses that were in course of erection have been blown down, and a chimney stack fell through a roof on to a bed in which three ladies were lying, and one of them was seriously hurt.

No. 91.

The *Daily News* says:—'The report we heard half a mile away, and the concussion was so great that the property surrounding the Market Square was shaken to its very foundations. Scarcely a shop in the centre of the town escaped; windows were smashed by the hundred, and the shopkeepers were panicstricken, as they hastily came to the conclusion that the shock was the result of an earthquake.'

No. 92.

A gentleman writes:—'I observed, for several successive summers, a toad watching for overloaded bees who failed to reach the threshold of the hives. No sooner did they fall to the ground than he snapped them up. But one day I saw he had lost by some accident his right eye, and when he struck at a bee he missed his aim, and picked up dirt from one side of the bee. He wiped his mouth with his fore-paw, and tried again and again. The bee generally managed to climb to the top of some little prominence on the ground, and fly away before the toad succeeded.'

No. 93.

A traveller says:—'I don't believe I was ever nearer death's door. Four or five times I was tempted to rush down to the rescue, but I afterwards learned that such an act on my part would have been certain death. For ten minutes I suffered the agony of seeing my dog die, and then turned and fled from the spot. While there I saw a bird fall a victim to the deadly fumes. It evidently intended to fly to the bottom of the valley, but before it reached the ground it fell dead. I don't believe it lived half a minute after entering the deadly atmosphere.'

No. 94.

The most interesting feature of the old and ruinous castle is the bottle-dungeon, which has been hewn out of the solid rock on which the north-west tower stands. It has exactly the shape of a gigantic bottle, and enormous its size most certainly is, for the neck is eight feet deep and seven feet across, while the diameter of the body is seventeen feet, and its depth sixteen feet. Fearful was the lot of the unhappy man confined within these walls, where the light of day never penetrated, and whence escape was impossible. Yet famous men have been imprisoned in this cell.

No. 95.

Some one has told us that flowers grow best in the gardens of those who love them, and that seems natural enough, for the more we love anything the more care and thought we bestow upon it. In this great and beautiful garden there was but one gardener to do all the work. He must have loved the things he planted there, for they grew in profusion. They grew and bloomed with all their might, as if they loved growing and blooming, and found life in this paradise a fair and beautiful thing.

No. 96.

A Governor in India had a trap set for a wolf, which was perfectly well known in the district, and caught it. Out of regard for the native prejudice he did not kill it. Instead, he had a good sized bell hung around its neck and set it at liberty. In a few days it was found dead. The bell had acted as a signal of its approach, and as every creature fled as soon as it heard the noise, the man-eater was starved to death. Its blood not having been shed no ill was expected, and the folk were freed from a pest.

STANDARDS V.—VII.

No. 66.

Even the London rough, who is not otherwise æsthetic in tastes, is dimly conscious that flowers have a decorative value, and add to the graces of the person on high days and holidays. Many of the plants, no doubt, which the poor receive will be reared with insufficient knowledge, though even the most skilful floriculturist might fail under the conditions against which the humble flower lover has to contend. Of course, the working classes who are fairly well-to-do, living in healthier and cleaner localities, are often not only clever gardeners but very keen connoisseurs of garden produce, and to these classes we suspect that a large number of the plants find their way.

No. 67.

Were clerks in the service of the State to be allowed to make good the contention of the Post Office officials now under suspension, there would be nothing to prevent the Civil Department of the War Office or the Admiralty being left without assistants at a moment of national peril. A Commander in the field might be obliged to fight without his instructions, or an Admiral be unable to put to sea for want of his sealed orders, because, as the clocks struck six, the clerks engaged in preparing those documents had dropped their pens and taken their hats and umbrellas. Strikers of all kinds seem to imagine that they will be sure of public sympathy; but we do not believe that in the present instance any great amount will be forthcoming.

No. 68.

Sir John Lubbock remarked that the City of London was more indebted to the College than the College was indebted to the City. The College was very nearly self-supporting, and bankers and other business men might with advantage make use of its examinations. He asked those who came to the College what was their object in doing so? To put it briefly, he supposed that their desire was to train and fit themselves as far as possible for a perfect life. They knew, indeed, that they could never attain such an ideal, but they could all try, and the more they tried the happier would be their lives. Business was a matter of sentiment and feeling far more than many supposed, and a frank, pleasant manner would often clench a bargain more effectually than a half per cent.

No. 69.

There are only three pleasures in life, pure and lasting, and all derived from inanimate things—books, pictures, and the face of Nature. If a man had not the elements of happiness in himself, not all the pride and pleasure the beauty and interest of the world could give it to him. To one man the world was barren, dull, and tiresome; to another it was rich and full of interest. They were born to a great privilege, but also to a great responsibility. If they wished to be happy they must think as little as might be about themselves. "Do not," as Ruskin said, "seek for amusement, but be always ready to be amused." Let them try to make others happy, and they would be happy themselves.

No. 70.

The Earl of Derby, in the presence of a large assemblage, on Saturday unveiled a statue of the late Mr. John Bright. He said he asked them to join in paying honour to the memory of a man who was remarkable in his day, and who was, during many years, more praised and more abused than was the fate of any except a very few. John Bright gave hard blows, but he was prepared to take them in return. The fighting instinct was strong in him, but there had seldom been an Englishman yet, whatever his theory of life might be, to whom a fair stand-up fight was altogether distasteful, or who did not respect pluck when shown in a cause opposed to his own.

No. 71.

Now that school fees are abolished, parents and children who benefit by the measure are receiving excellent advice both from the Education Department and the Post Office Savings Bank. Each of these offices has issued a circular enforcing the desirability of investing the money thus saved. The former mentions that in France and in Belgium school savings banks have assumed large proportions, and are excellent institutions for inculcating habits of thrift. The Education Department, therefore, reminds managers and teachers of the special facilities offered by the Post Office for the establishment of penny banks in schools. Such banks, when formed, may readily be placed in connection with the local Post Office Savings Bank.

No. 72.

At a time when the mind of the whole community is stirred to consider the condition of the homeless, the outcast, and the most degraded of the population of this city, it is at least brought home with the utmost force to us all, that, whatever be done for these, it is the simplest social prudence to help the children of the poor, who are still clinging to homes, wretched though they be, with some remnants of respectability, in order that whilst yet within the reach of help, these children may be given food, teaching, and training to fit them by-and-by to earn a wage by which they can live decently, in possession of the self-respect which belongs to such capacity. To neglect these children must be to increase hugely in the future the difficulty of a problem already tremendous.

No. 73.

Sir J. Lubbock said:—'It was commonly supposed that people in the City of London were engaged in one pursuit—that of wealth. He had no desire to undervalue money, but the feverish pursuit of wealth, which in all great cities was a source of danger, was certainly not conducive to peace and happiness. On an occasion like this, however, they were specially concerned with the intellectual side of life. In this institution they had access to all that was best in our literature. And yet many people really seemed as if they scrupulously avoided all great authors. In this busy age we had comparatively little time for reading, and ought, therefore, to choose with the utmost care, always remembering that our heads should be, as Bacon nobly said, "Not a grave, but a treasure of learning."'

No. 74.

The English nation, as a whole, are musical, but require more education than they have had at present, which must be brought to them in a less expensive and more comfortable form. You cannot make a nation lovers of the best music in a generation, and it is only quite of late that a few English parents have allowed their children to study music or instruments seriously. But those that have done so flock to hear a great exponent of the instrument on which they spend so much time, and as they obtain sufficient technical skill to themselves perform the classical works which are constantly brought before their notice, the beauties and value of these works will gradually dawn on them, and their taste for the bigger works of the great composers will then develop.

No. 75.

As an orator, Bright was the one authority who would always be appealed to by those who contended that classical models were not required for the formation of an English style of speaking or writing; but it was to be remembered that if he was not familiar with the literature of Rome and of Greece, the English poems of Milton were his favourite study, and when all was said, style depended less on what a man had read than on what he was. The oratory of Bright was what Parliamentary and popular oratory should be—directed to convince, rather than to dazzle or amuse; the speech of a man who had action in view, not the literary exercise of the rhetorician.

No. 76.

The rector in his address said:—'They had met to do honour to the memory of one who was well known in that parish. They had lost a very great and a very dear friend. The whole course of his life was religious, and his works, indeed, followed him. Mr. Smith was always ready to benefit his neighbours, and had always taken a deep interest in the working classes—and the poorest classes. When asked to contribute towards the purchase of a piece of land in the parish for a mission-hall, he gave at once £100. When asked if he would aid in sending poor children into the country, his answer was a five-pound note; and when solicited in aid of giving the poor flower-sellers a holiday, his reply was a cheque.'

No. 77.

Up till November, 1889, the Emperor of Brazil appeared to be a prosperous and fortunate monarch. If his Throne showed signs of weakness when compared with the Dynasties of Europe, it seemed, when judged by the South American standard of political stability, exceptionally secure. He had not long before been restored to health after a dangerous illness, while the edict completing the liberation of the slaves had been received without disturbance. Yet, within less than a year, the Emperor lost his Throne and his Consort, and, after two years of enfeebled health, has died before his time, and yet survived all that was worth living for.

No. 78.

The Master of the Rolls said:—'When he heard of the great loss which the profession and the public had sustained by the death of Mr. Baron Huddleston, he felt that so remarkable a person, so long known to the profession and so universally beloved, could not be allowed to pass away without testimony being given as to the respect and esteem in which he was held, both by his colleagues on the Bench and by the Bar. He thought, however, that it would be better that that testimony should emanate in the first place from the Bar, instead of from the judges, his colleagues. All the judges who were at present in town, and who could by any possibility attend, were present, and those who were absent would have attended had it been in their power to do so.'

No. 79.

The striking characteristic of Mr. Baron Huddleston throughout his life was indefatigable industry. In every case, however small, he took the greatest trouble to make himself thoroughly acquainted with the facts, as well as with the law and the cases bearing upon it. To that industry he united remarkable powers of persuasion, which carried with him the minds of those who listened to him; and these qualities, joined to a peculiar lucidity of statement, made him a most successful advocate. There was in him a certain lightness of manner—he was known to be fond of society—which, when he was made a judge, induced some, who did not know the more earnest part of his character, to doubt whether he would have the same success on the Bench that he had enjoyed at the Bar.

No. 80.

Experience has shown that many of the evils which weigh most seriously on the industrial classes in this country are the results of improvidence and waste. But some of these evils admit, at least, of partial remedy. To learn how to economise slender resources, how to resist temptation to needless expense, and how to make reasonable provision for future contingencies is an important part of education. Such knowledge is calculated to protect its possessor from much trouble and humiliation, and to help him greatly in leading an honourable and independent life.

No. 81.

The *Standard* says:—'The Princess, like her mother, is a universal favourite, and her future husband stands in the direct line of succession to the Throne of England. The warmest well-wishers of the Princess could scarcely desire a more distinguished position for her; and when to this it is added that the marriage, unlike so many others which are contracted in these exalted circles, is one of affection on both sides, we have said enough to explain the general satisfaction with which the intelligence will be received. The Princess herself, whose personal attractions are well known, is only twenty-four.'

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MODEL ANSWERS—CERTIFICATE EXAMINATION, 1891.

SECOND YEAR.

School Management.

1. α. From the following particulars of a week's attendance in a class of fifty scholars, calculate (*a*) the number of attendances, (*b*) the average attendance, (*c*) the percentage of attendance;—the attendance was regular with the following exceptions—There was a holiday on one half-day; three scholars were absent the whole week; eight were absent four times; on one occasion two came in just after the register had been closed, and two were withdrawn before the completion of the minimum time constituting an attendance.

β. Describe the various marks to be used in the foregoing cases, and say how the absence mark may be cancelled in the case of scholars attending a class for special instruction under Art. 12 *(f)*.

γ. What entries should be made at the foot of the attendance register, and when should they be made?

α. (*a*) *The number of attendances.*

Maximum possible = 50 × 9 = 450.

Deduct for 3 scholars absent all week ... 3 × 9 = 27 attendances.
" 8 " four times each 8 × 4 = 32 "
" 2 scholars once withdrawn ... = 2 "
" 2 " too late ... ... = 2 "

63 attendances.

Actual total made = 450 − 63 = 387 Ans.

(*b*) The average attendance = $\frac{\text{Total attendances}}{\text{No. of times open}} = \frac{387}{9} =$ 43. Ans.

(*c*) The percentage of attendance = $\frac{\text{Actual attendances} \times 100}{\text{Maximum possible}} =$ $\frac{38700}{450} = \frac{430}{5} =$ 86 per cent. Ans.

β. Presence is denoted by \, absence by O

Cancelled attendance by—

Cancelled absence through attendance at Cookery, Drawing, or Science Classes by—

etc.

γ. At the foot of the weekly attendance columns should be spaces for totals of the number present when the registers are marked, and the number withdrawn before the time constituting an attendance is complete.

2. (*a*) If you were the Head Teacher of a school, when and how would you test the progress of the several classes conducted by assistants or pupil teachers; (*b*) Describe the most efficient forms of test, and the manner in which you would make and preserve a record of the result.

(*a*) The progress of a class is best tested by the Headmaster by periodical examinations, and by occasional un-notified visits. Where possible the examination should be oral and individual, and prominence should be given to the investigation of method, tone, and principles, quite as much as to gauging the knowledge acquired.

(*b*) For the periodical examinations a register of each scholar's individual progress should be kept, wherein should be regularly recorded, not only advance in knowledge and mechanical accuracy, but development of cleanliness, obedience, artistic taste, and mental power. The most efficient tests are those which discover the industry, carefulness, self-reliance, and power of applying facts of the scholar.

Upon occasional visits, the Head Teacher should request the Class Teacher to examine, and should himself add supplementary and critical questions. He should particularly note how the dullards are stimulated, and the acute ones steadied.

3. (*a*) Explain why a universal negative proposition admits of the conversion of its terms. 'All equilateral triangles are equiangular.' (*b*) Say whether the terms of this proposition are convertible. If not, why not?

(*a*) In every universal negative proposition no portion of the Extention or Denotation of the terms is common. In the examples:—

No man is a stone (= No man is any stone.)
∴ *No stone is a man.*

The latter follows from the former because the Extensions of *man* and *stone* are asserted to be totally exclusive of one another.

(*b*) '*All equilateral triangles are equiangular*,' although mathematically convertible into another universal affirmative, is not logically so, because the full proposition is '*All equilateral triangles are* [*some*] *equiangular triangles*,' and in this the Extension of the first term is only a portion of the Extension of the second term. Wherefore we cannot use the second term universally as the subject of a derived proposition.

4. (*a*) What is meant by Abstraction and by Generalisation? (*b*) Give examples of both these processes, and show how a knowledge of them would enable you to explain to pupil teachers the true nature of an Abstract Noun and of a Common Noun respectively.

(*a*) The attributes implied by any term constitute its Connotation or Comprehension. If now we take any term whose connotation is known, and leave out some of the attributes connoted, we thereby form a new notion which denotes, or may denote, a larger number of individuals. This process of removing attributes is called *Abstraction*, and the resultant process, whereby the Extension of the new notion is more and more increased, is called *Generalisation*.

By Abstraction we travel from the *Species* to the *Genus*, the former of which has a larger connotation and less extension, and the latter of which has a less connotation and a larger extention.

Thus, if we take the term *man* whose connotation is *rational* and *animal*, and leave out the attribute rational, we arrive at the term *animal*, whose connotation is less than that of *man*, but whose extension is greater. *Animal* is the genus, *man* the species.

(*b*) Pupil teachers may thus be shown that any name which is a *genus* or *generalisation* is a Common Noun, and that the name of any attribute which may be abstracted is an Abstract Noun.

5. (*a*) Explain the precise meaning of the words—Simple Apprehension, Judgment, and Reasoning—as used in books on Logic. (*b*) Give examples of each of these mental operations, as they occur in ordinary school exercises.

(*a*) 1. *Simple Apprehension*, which is also called *perception*, is the operation by which the mind receives notions.

2. *Judgment* is the affirmation or negation of one idea about another. Expressed in words it is called an *enunciation*, and more frequently a *proposition*.

3. *Reasoning* is the inference of one judgment from two or more.

N.B.—*Simple Apprehension* is the faculty (rather than operation) whereby we get ideas. *Judgment* is the power to compare idens so as to determine their agreement or disagreement, and to *Reason* is to infer the agreement or disagreement of ideas, incapable of immediate comparison, from their comparison with other ideas.

(*b*) *Simple Apprehension* is exercised in all mere memory exercises, and in the reception of every bare and isolated fact, as in History and Geography. *Judgment* comes into play, especially in Grammar, in discovering the Part of Speech to which any particular word belongs; Reasoning appears, perhaps, most in arithmetical problems, of which a typical instance is the 'Rule of Three.'

6. Should the definition of a grammatical term be taught before or after the use and explanation of examples? Give reasons for your answer, and say how the two methods of procedure are logically distinguishable.

This question turns upon analytical and synthetical teaching. Suppose we take as a definition of a Verb, '*A Verb is a word which asserts*,'—then we may either first teach this definition and, proceeding analytically, select all the Verbs, and show that they correspond with the definition; or without teaching any definition at the commencement, pick out the vital word from each simple sentence and show its property, and then deduce the definition by synthesis.

As in most things, the *via media* appears to be the true method. Without doubt some minds tend more to analysis and others to synthesis, whilst in all, the two methods judiciously mingled are most serviceable.

As the Verb is taught in Standard II., it is perhaps best to impose the definition first, as its reception involves lower intellectual powers than its construction.

7. Give the notes of a lesson to a class of children on any one of these subjects:—

(*a*) Fresh air and its uses.

(*b*) The skin and its functions.

(*c*) Cleanliness (*for infants*).

NOTES OF LESSON ON FRESH AIR AND ITS USES.

To Standard V. for 40 minutes. Knowledge of only ordinary facts assumed.
Apparatus required.—(1) An air-tight bag with orifice. (2) Glass jar of clear lime-water.

Heads of Lessons	Matter	Method
1. Popular notion of Fresh Air generally correct.	Fresh air generally obtained by in-draught. Fresh air generally purest upon mountains and at sea-side.	Cause a draught to be apparent by its effects, both to the sight and to the touch.
2. Bad effects of Foul Air.	(1) Heats too much. (2) Vitiates the blood and causes headaches, etc. (3) Conveys disease germs. (4) Stunts the growth.	Appeal to children's experience as to heat and lassitude experienced in close rooms. Get a scholar to breathe into and out of the air-tight bag. Relate story of 'Black Hole' of Calcutta. Blow into the clear lime-water, making it milky. Point out the stunted stature and frequent sicknesses of alley-dwellers.
3. Functions performed by Fresh Air.	(1) Raises the spirits. (2) Incites to action. (3) Purifies the blood. (4) Removes infectious matters.	What is the scholar's personal experience of out-door exercise? Refer to a stagnant pool, and compare with stagnant air. Just as fire consumes filth, and water sweeps it away, so fresh air, with its oxygen, burns up disease germs, and by its current sweeps them into the open.

8. Say how you would treat these cases:—

(1) That of a scholar very backward in Arithmetic, but equal to his fellows in other subjects.

(2) That of a scholar not capable of being taught with profit, even in Standard I.

(3) That of a habitual late-comer.

(1) He should be put back into a lower standard for Arithmetic only, and there should have especial attention paid him, by fuller explanations, and more frequent questioning. Ofttimes it is wise to allow him to work dually with a trustworthy and proficient comrade.

(2) These are very few in number, for they are either lacking in brain-power, or have been terribly neglected. If lacking in mental capacity they should be taught in special institutions, which it is just as much the duty of the State to provide, as to provide asylums and schools for the blind. If merely backward through neglect, their treatment depends in a great measure upon their age. Be they not too old, they should be relegated to the Infant School; but if of too great age, they should be taught by themselves in an upper department under the constant supervision of the Head Teacher, and then by virtue of their age and more ripened faculties (for there is other education besides that of the schoolroom), they will soon fall into line with Standard I.

(3) Any shortcoming should not be dealt with empirically, but its root and cause should be inquired into before any remedy be sought to be applied.

Now late-coming arises from (*a*) causes beyond the scholar's control, and (*b*) from the scholar's own fault.

(*a*) These are sometimes irremediable, and then the late-coming MUST be excused; but generally much may be done by a Teacher in touch with, and trusted by the parent.

(*b*) When the scholar is himself to blame, sometimes he must be incited, sometimes encouraged, and at times punished, according as he is listless, impeded, or culpably neglected.

9. It has been said that the object of school education is not only to communicate knowledge, but to teach the learner to act and think for himself. Explain how, and by what sort of lessons, you can best give effect to this principle, *either* (*a*) in an Infant School, *or* (*b*) in a school for older children.

(*b*) *In a school for older children.*

(1) *To think for himself.*—As thought is the spring of action, if a scholar be taught to think for himself, he will, unless led away by bad example, act for himself.

Lessons should be given (*a*) Inculcating liberty of conscience; (*b*) Upon great inventors; (*c*) Half-suggesting solutions of problems, which the scholar will delight in completely mastering; (*d*) And upon mishaps arising from the too slavish following of a general rule.

(2) *To act for himself.*—If a person *think* for himself, he will *act* for himself, except under pressure of example or emergency. Lessons, therefore, upon Moral Courage and Presence of Mind are all additional that is required.

10. Give an outline of a course of lessons on Elementary Science, adapted for the scholars of the Sixth Standard, and designed to explain the laws of health.

A course of elementary lessons should neither be too long nor too discursive. It should not exceed at the outside a dozen, and should cling closely to the main theme. We will take ten lessons.

COURSE OF LESSONS.

(*a*) *The Constitution of Man.*

Lesson 1. Man's bodily constitution as to structure.
" 2. " " " " corporeal functions.
" 3. " mental constitution.
" 4. " moral "

(*b*) *The immediate circumstances of his environment.*

Lesson 5. The air we breathe.
" 6. " food we eat.
" 7. " clothes we wear.
" 8. " habits we acquire.

(*c*) *Cautions.*

Lesson 9. Against social vices.
" 10. " natural dangers.

11. (*a*) What does Mr. Spencer think of Montaigne's doctrine that 'to learn by heart is not to learn at all.' Reproduce the argument employed in connection with this saying.

Montaigne long ago said—*Scavoir par coeur n'est pas scavoir*, and Mr. Spencer thinks this dictum to be substantially true; for in mere learning by heart more is made of the bare forms and symbols than of the things which they represent, and the spirit is sacrificed to the letter.

Moreover, such a result is not accidental but a necessary consequence where too much attention is paid to the signs, and scarcely any at all to the things signified.

11. (*b*) Reproduce Locke's arguments respecting the learning (1) of Latin, and (2) of a modern language.

(1.) 'Latin,' says Locke, 'I look upon as absolutely necessary to a gentleman, but how necessary soever Latin be, the method which I imagine the easiest is—to trouble the child with no grammar at all, but to have Latin talked into him as English has been. If a man cannot be got who speaks good Latin the next best is taking some easy and pleasant book and writing the English translation (made as literal as it can be), and the Latin words just over it. These let him read over and over again till he perfectly understands the Latin. When he comes to write, the formation of the Verbs first, and afterwards the declension of the Nouns and Pronouns perfectly learned by heart, may facilitate his acquaintance with the genius and manner of the Latin tongue. When by these ways he has got a moderate knowledge he may then be advanced to the reading of some other easy Latin book, such as Justin or Eutropius, helped by an English Translation, for languages are only to be learned by rote.'

(2.) As soon as a child can speak English it is time for him to learn some other language. This nobody doubts of when French is proposed. The reason is that people are accustomed to the right way of teaching that language, which is by talking it into the children in constant conversation and not by grammatical rules. We often see a Frenchwoman teach an English girl to speak and read French perfectly in a year or two, without any rule of grammar, by nothing else but prattling to her. Because French is a living language, and to be used more in speaking, it should be learned before Latin, so that the yet pliant organs of speech might be accustomed to a due formation of those sounds, which is the harder to be done the longer it is delayed.

12. (*a*) Discuss Mr. Spencer's views on (1) Pestalozzi and his system, and (2) on Drawing as an instrument of education.

(1) It should be constantly borne in mind that while Pestalozzi was right in his fundamental ideas, he was not therefore right in all his applications of them. He was a man of partial intuitions rather than of systematic thought. Much of his power was due not to calmly reasoned-out plans of culture, but to his profound sympathy. He lacked the ability logically to co-ordinate and develop the truths which he thus from time to time laid hold of.

His nursery method is not in accordance with the initial stages of mental evolution, and his process of teaching the 'mother tongue' would entail upon the pupil loss of time, labour, and happiness. Yet we are on the highway towards carrying out his great principle, 'that alike in its order and its methods, education must conform to the natural process of mental evolution.'

(2) During early childhood no formal drawing lessons are possible; but by furnishing cheap woodcuts to be painted, and contour maps to be tinted, we can incidentally produce some familiarity with the outlines of things and countries, some ability to command the fingers, and some tolerable ideas of proportion, in addition to a vague notion of body, as presenting its three dimensions in perspective.

In due time by observation through a pane of glass, and by ordinary practice, and without the unintelligent, mechanical practice of copying other drawings, a familiarity with the linear appearances of things, a faculty of rendering them, the true theory of a picture, the primary conceptions of geometry, and a considerable advance of the observing and inventive faculties may be arrived at.

12. (*b*) (1) What are the faults in manner and behaviour which, in Locke's opinion, most need to be corrected in youth? (2) Describe Locke's ideal of a well-bred man.

(1) (α) *A natural roughness* that allows an unbounded swing to one's own humour, and suffers it to jostle or overrun with a perfect indifferency anyone that stands in its way;

(β) *Lack of due respect* discovered either in looks, words, or gesture;

(γ) *Censoriousness*, *raillery*, and *contradiction*;

(δ) *Captiousness*;

(ε) *Excess of Ceremony*;

(ζ) *Interposing in Conversation.*

(2) Locke's well-bred man is not sheepishly bashful nor misbecomingly negligent of carriage. He preserves the due medium of self-respect between inordinate assurance and extreme self-depreciation. In him a desire to please is expressed in an agreeable and acceptable way; and his looks, voice, words, motions, gestures, are alike all pleasing. His is a general goodwill and regard for all people, a lack of presumption, a judicious reticence, and more than a modicum of learning.

13. (*a*) What is meant by self-evolution, and how does the author illustrate and express his arguments on this head?

Self-evolution is a process of unfolding, developing and strengthening the faculties of our being, by means of internal utilisation of exercises suitably correlated to the natural (viz., intellectual, volitional, moral, and corporeal) growth and expansion of the faculties themselves.

Mr. Spencer speaks of knowledge which is turned into faculty as soon as taken in, and appeals to his own experience of having been *led* to solve in youth the comparatively complex problems of perspective.

Self-evolution guarantees an unequalled vividness and permanency of impression, as for instance, where a problem has been solved without help, for then the faculties are *actively* occupied, instead of being merely *passively* receptive.

Moreover, self-respect is fostered, and a kindly disposition is engendered towards that teacher who adapts the mental material for self-manipulation, who encourages in difficulty, and sympathises in success.

13. (*b*) Give the substance of Locke's remarks on the thirst for knowledge in children.

Children are much less apt to be idle than men, and in Portugal it is impossible to HINDER the children from learning to read or write, for they will learn it from one another, and are as intent upon it as if it were forbidden them; and in France they teach children to sing and dance from the cradle.

Learning might be made a play and a recreation to children; they might be brought to desire it to be taught. They, if you observe them, take abundance of pains to learn games; novelty attracts them, and whatever presents this, they are eager to have a taste of.

14. (*a*) 1. How does Mr. Spencer's view of the discipline of consequences help a teacher in the conduct and moral government of a school; and (2) in what way, if any, does that view seem to you inadequate?

1. (i) It teaches that as few artificial offences should be recognised as possible.

(ii) It inculcates the inevitability with which punishment should follow misconduct.

(iii) It suggests that punishments should be of the same character as the misdeed.

(iv) It instructs the teacher to avoid the character of a punisher, and to place the onus of painful correction upon circumstances and nature itself.

2. Mr. Spencer's view is inadequate, inasmuch as it often :—

(i) Delays the punishment too long.

(ii) Allows consequential punishments to be of too great a magnitude.

(iii) Is utterly disassociated from the moral side of our nature, and appeals only to some of the lowest principles of humanity.

(iv) Disregards the use to be made of others' experiences.

14. (*b*) What practical rules could you deduce from the Essay respecting (1) the teaching of Writing, and (2) the study of Nature?

1. (i) To attack difficulties in detail.

(ii) To attend to the holding of the pen, and the position of the body.

(iii) To employ tracing in the elementary stages; and

(iv) To teach large hand before small hand.

2. (i) To avoid treating of Nature as if it concerned *matter* only?

(ii) To refrain from contemning the inexact sciences.

(iii) To proceed where possible from first principles; and

(iv) To study the delightful and agreeable, as well as the convenient and the necessary.

FIRST YEAR.

School Management.

MALE CANDIDATES.

1. (*a*) What is meant by mental suggestion or the 'association of ideas'? (*b*) Give some examples, and (*c*) show in what sort of school lessons the principle of association is of most importance, or is best illustrated.

(*a*) *Mental suggestion* or *Association of ideas* is a pyschological faculty, by means of which certain ideas are recalled by their connection with other ideas through some tie of (1) logical sequence,

(2) contiguity, (3) similarity, (4) contrast, or (5) extraordinary occurrence, etc.

(*b*)	*Original idea.*	*Suggested idea.*
(1)	A shipwreck	What lives are lost?
(2)	Our homes	Our relatives
(3)	A May day	Smiles and tears
(4)	An angel	A devil
(5)	Lightning struck the house	We had green peas for dinner that day

(*c*) *Primâ facie* those lessons into which reasoning enters the least, and perception the most, those lessons wherein knowledge is imparted and the intellect only indirectly trained, afford the largest field for the exercise of the principle of association of ideas. Geography, History, Geology, Physiography, and Poetry and Music mutually assist one another.

2. (*a*) What are the mental processes concerned in an act of remembering? (*b*) Distinguish between memory of words and the memory of things, of facts, or of truths; and (*c*) say when and how far a teacher is right in requiring the exercise of merely verbal memory.

(*a*) To remember anything the mind must *first* perceive, *second* retain, and *third* reproduce.

(*b*) The memory of mere words or verbal signs is almost an unintellectual process; the memory of things is a perceptive act; the memory of facts is frequently an act of judgment; and the memory of certain truths is also judicial, but sometimes borders upon reasoning.

(*c*) A teacher is seldom right in requiring the exercise of mere verbal memory; but in a few instances it may be profitably employed, as—

(1) A record of judgment or reasoning.
(2) An exercise employed to train the memory.
(3) As a fund to be hereafter drawn upon, when the mind is more matured.

Verbal memory should never supplant the higher species of memory, and should always be of concrete value.

3. Say what is the earliest form of mental power observable in the history of a young child, and show by what sort of school exercises you could encourage and develop it.

The process of attaining knowledge sets out with Sensation, or the reception of external impressions by the mind. Sense supplies the materials, which the intellect assimilates and elaborates according to its own laws. Before we can know anything about the material objects of our environments they must impress our minds through sight, touch, hearing, etc.

Sensation may be most efficiently encouraged and developed by a judicious series of 'Object Lessons,' and even by exercises, such as musical drill, which imparts notions of sound, time, rhythm and even relativity.

Object lessons may appeal to the eye, the ear, the touch, and even the taste and the smell.

4. At what point in your teaching of arithmetic would you introduce 'rules,' and require them to be learned? Give a sketch of a model lesson on 'division by factors,' showing when and how you would teach the rule for that operation.

Rules of arithmetic should be introduced when by induction they have been sufficiently led up to, and when it is desirable that mechanical facility be obtained. This is, of course, on the hypothesis that the different steps of Arithmetic are suitably graduated in accordance with the mental development of child, otherwise '*rules*' would have to be at the commencement arbitrarily and verbally learnt with the hope that their reason may be afterwards imparted.

Sketch of a lesson on 'Division by Factors.'

Divide 59817 by 42.

6	59817 units
7	9969 sixes 3 units
	1424 forty-twos 1 six 3 units, or
	1424 quotient and 9 remainder.

Sometimes, instead of taking one long step, we can take two or more shorter steps and arrive at the same result.

Thus we may make at once by one operation 1,424 parcels, each containing *forty-two* articles out of 59817 articles (and have 9 overplus), or we may apportion into 9969 sixes (and have 3 overplus), and then bind up the sixes into parcels of 7 sixes each, etc.

It would be well also to vary the process and divide first by 7 and next by 6.

7	59817 units
6	8545 sevens 2 units
	1424 forty-twos 1 seven 2 units, etc.

Next a number should be divided by 24 at once, then mediately through its factors 12 and 2, through 6 and 4, through 3 and 8, etc., and finally from the correspondence of answers, from enough inductive particulars, the rule would be established.

5. It is said to be a good principle in teaching that 'we should proceed from the known to the unknown.' (*a*) Discuss this dictum, and (*b*) show how it ought to regulate, for example, the mode of commencing a lesson on some unfamiliar object.

(*a*) This is merely the law of progress from the elementary to the composite, to master one stage of advancement before proceeding to the next. If a demonstration proceed upon principles not already understood, if a description contain terms of no meaning to the person addressed, if directions involve acts not previously performed, the result is failure. Where there is no foundation there can be no lasting superstructure, and in any case, even where previous knowledge is not the actual stepping-stone, it may be utilised for associative and illustrative purposes.

(*b*) In a first lesson upon the shape of the earth, the universal knowledge that the sun and moon always appear round may be brought to bear upon the hitherto unknown fact that our earth is round also. This would be, without doubt, the best introduction to the lesson.

6. Write out brief notes of a lesson on one of these subjects:—

(*a*) The cases of pronouns.
(*b*) The House of Commons.
(*c*) (*For Infants.*) Snow and Hail.

(*a*)—The Cases of Pronouns:—

To whom given? Standard IV. *What knowledge assumed?* Cases of Nouns, Government by Verbs and Prepositions, Subject of Sentence.

Of what length? Forty Minutes. *Apparatus required?* Blackboard and Reading Books.

Heads	Matter	Method
1. Recapitulation of definition of *Case*, *Pronoun*, and *Inflection*.	*Case* is the term employed to denote the grammatical function (sometimes expressed by Inflection), of a Noun or Pronoun in a sentence. A *Pronoun* is a word which represents a Noun. *Inflection* is a change in the ending of a word to denote an alteration of its grammatical use.	Take only Nom., Poss., and Obj. Cases, and get sentences containing Nouns in these Cases. Names of Persons will be best. Show that only the Possessive Case of Nouns is inflected. Next substitute in the illustrative sentences, Pronouns for Names of Persons.
2. The Pronominal Case Forms.	I We; Thou Ye; He They my our; thy your; his their me us; thee you; him them, etc.	Deal only with the Personal Pronouns. Utilise the knowledge of Case in Nouns. Call special attention to the inflections.
3. Consequence of Case *Forms*.	Selecting Case in Nouns is often an exercise in reasoning; in Pronouns, it need only be (in most instances) an exercise of Memory.	Point out that I, my, me, etc., are *invariably* Nom., Poss. and Objective. Make the scholars to *learn* the Declensions of the Personal Pronouns.

7. (*a*) What is meant by the faculty of observation, and why is it desirable to cultivate it? (*b*) Give some examples of excercises calculated to strengthen this faculty (1) in a rural school, or (2) in a school situated in a large town.

a. A careful direction of the mind to objects, a special degree of

mental activity thrown into *Perception*, is commonly spoken of as *Observation*. It is desirable to cultivate it, in order to take particular note of the several parts and details of any object. In its highest form it implies—

(1) A *deliberate selection* of an object;
(2) A close *concentration of the attention* upon it; and
(3) *Methodical working* in order to obtain an exact account of the given phenomena.

Observation may thus be spoken of as *Regulated Perception*. Unless it be cultivated it cannot attain to this serviceable height.

b. (1) *In a rural school* exercises upon the elementary structure and form of plants, and upon the habits and flight of birds, will evoke and strengthen this faculty.

(2) *In a large town* the staple manufacture should largely supply the exercises, and accounts of public buildings may well be asked for.

In all places the narration in a vertebrated form, either orally or in script, by the pupils of what they have seen and heard under various circumstances will afford a ready means of regulating, strengthening, and complementing Observation.

8. Describe the kind of manual employments best suited to give to very little children ideas of form and of construction, and to give early training in invention and design.

Perhaps the three best occupations are—

(1) The manipulation of the jointed-lath.
(2) Stick-laying, *or* peas and sticks.
(3) Clay-modelling.

These should certainly precede even the rudiments of Drawing, and the two first should be practised before the third, as they only involve ideas of two dimensions of space or imitate well-known objects.

With the *jointed-lath*, letters (properly graduated), a knife, a cross, a railway signal, a gate, a square, an oblong, a triangle, etc., may be represented.

With *stick-laying* the same exercises may be performed, and an elementary idea of solidity also obtained.

With *clay-modelling* (which is the higher form of mud-pie-making) the common geometrical forms may be reproduced, and ordinary objects, especially fruits and earthenware utensils, imitated.

9. If the following passage occurred in a reading book, what explanations or illustration would you think it desirable to give in connection with it?—

> 'Of all the living creatures that people the immensity of the ocean, the cetaceans, or the whale family, are the most perfect. Their anatomical construction renders them in many respects similar to man, and their heart is susceptible of a warmth of feeling unknown to the cold-blooded fishes, for the mother shows signs of attachment to her young, and forgets her own safety when some danger menaces her offspring. Like man, the cetacean breathes through lungs, and its heart pumps to all parts of its body streams of warm, red blood.'

In explaining this passage it must first be remembered that it would not occur in any book adapted to any 'Standard' lower than V.

FIRST, the words *immensity*, *cetaceans*, *anatomical*, *susceptible*, *attachment*, *menaces*, *offspring*, *lungs* should be explained.

SECOND, a few remarks upon 'warm-blooded' and 'cold-blooded' animals would be necessary, and the influence of the nature of their vital fluid upon their characters should be explained. Illustrate by the comparative indifference of reptiles and fishes for their *offspring*.

THIRD, some brief observations upon respiration would be profitable.

10. The Code directs that the earliest lessons in history for young children should be anecdotal and biographical. (*a*) Give reasons for this recommendation, and (*b*) mention a few leading incidents in English history, which you think might be usefully narrated to learners before their regular chronological study of English history begins.

(*a*) (1) Children prefer action to thought.
(2) Children prefer facts to principles.
(3) Children prefer men to measures.

(*b*) The landing of Cæsar, the settlements of the Saxons, the irruptions and ravages of the Danes, the life of Alfred the Great, the battle of Hastings, the assassination of Becket, the signing of Magna Charta, the deeds of Wallace, the heroism of Joan of Arc, the alternated persecution of Protestants and Romanists, Gunpowder Plot, the stubborn fights for maritime supremacy with the Dutch, the Massacre of Glencoe, the battles of Blenheim, Culloden, and Heights of Abraham, the life of Washington, the battles of Trafalgar, Waterloo, Inkerman, and Balaclava, and the deeds of Havelock, Wolseley, and General Roberts might well be dilated upon.

11. Describe in words, and with your own diagrams, a suitable elementary course of freehand drawing, either (*a*) for an infant school, or (*b*) for a school for older children.

(*a*) *For infants* of first or second classes.

(1) In full accordance with and full faith in Mr. Spencer's principles I would, coincidently with the 'following,' allow drawings and even colourings of common animals and other objects. If children are left to themselves the first thing that they draw is a man, and the rude relics of ancient art found in caverns and scratched upon bones depict animals and skirmishes.

(2) It is absolutely unnecessary to give in these pages diagrams, etc., of a *formal* elementary course in drawing, as these can be found in *many* good published series, and especially in Kindergarten works.

12. Describe what appear to you to be the wisest and most effectual ways of dealing with disobedience or other misconduct (*a*) in an infant school, or, (*b*) in a school for older children.

The great principles of dealing with disobedience or any other misconduct, wherever it may take place, are—

(1) Look past the conduct to the motive.
(2) Let any punishment be as automatic as possible.
(3) Enlist the examples of orderly scholars on the side of discipline.
(4) Avoid inciting to offences, and occasionally and judiciously ignore them.
(5) In the last resort, stamp out with a measured severity any misconduct.

With younger children the reason cannot be so much appealed to, and indeed offences are not so flagrant; but with elder scholars less should be endured, obstinacy must not be tolerated, and where persuasion avails not, authority must step in.

It is a great mistake so to deal with elder children, that the treatment shortly to be meted to them when they leave school if they misconduct themselves, shall overwhelm them, by means of its insuetude and inconsideration.

PUPIL TEACHERS' COURSE.

Grammatical Notes.

We have recently had the privilege of examining about a hundred Pupil Teacher papers in Grammar, and it will be profitable to point out a few of the commonest faults.

In the *Composition* the majority of the sentences commenced with Nouns or Pronouns, and almost throughout there was a lack of flexibility in handling English. The chains of a limited vocabulary, especially in the case of synonyms, were plainly apparent.

Now two of the most elementary rules of literary Composition are:—

(1) Vary the construction of your sentences.
(2) „ „ words of those sentences.

There was also a marked disposition unduly to use contractions, which were even sometimes ambiguous.

For instance, what does '*Subj.*' mean—'*Subject*' or '*Subjunctive*'?

These abbreviations were frequently abruptly ended without a termination mark, and were occasionally meaningless.

Often, too, the word '*and*' was scarcely to be found, but some sort of a symbol was substituted therefor.

In Syntax there were three frequent errors:—

(1) The substitution of a Plural Verb, where a Plural Noun had intervened in a Prep. Phrase, between it and its Singular Subject, *e.g.*,

'The pang of many woes *were* patiently borne.'

(2) (*a*) A Collective Noun was followed by a Plural Verb, *e.g.*,

'The crew *were* greatly dissatisfied.':—

(*b*) and a kindred error

'The School Board came to visit *their* schools.'

It is not enough inculcated that '*Pronouns must agree in number, person, and gender with the Nouns they represent.*':—

PUPIL TEACHERS' ROUTINE FOR JUNE.

DAYS	YEARS	FIRST WEEK			SECOND WEEK			THIRD WEEK			FOURTH WEEK		
		1st Lesson	2nd Lesson	3rd Lesson	1st Lesson	2nd Lesson	3rd Lesson	1st Lesson	2nd Lesson	3rd Lesson	1st Lesson	2nd Lesson	3rd Lesson
Monday	1	Study Analysis of Sentences from Text-book	How to teach Spelling	Revision of Vulgar Fractions	Analysis and Parsing	How to teach Reading	Metric System	Analysis and Parsing	Subt. of Algebra. Knitting Socks	Map of Scotland	Analysis and Parsing	Revise Algebra Stocking-hole Mending	Geography of Australia
	2			Method of Unity Vulgar Fractions of Money					Multip. of Algebra. Knitting Stocking	Map of Italy		Revise Algebra Flannel Patch	Geography of India
	3		How to teach History	Stocks—Short methods with Repeaters		How to teach Arithmetic			Div. of Algebra Cross Cut Darn	Map of South Africa		G.C.M. of Algebra H dge-tear Darn	Geography of Asia
Tuesday	1	Revise any Euclid or Needle-work	Any Geography	Scripture or Revision	Revise any Euclid or Needle-work	Multip. of Vulgar Fracts. of Weights and Measures	Scripture or Revision	Euc. Bk. I. Prop. 3 Paper Patterns of Garments	Divis. of Vulgar Fract. Add. and Subt. of Vulg. Fct.	Scripture or Revision	Euc. Bk. I., Prop. 4 Paper Patterns of Garments	English from Text-book	Scripture or Revision
	2		Longitude			Method of Unity Abstract Vulgar Fractions		Euc. Bk. I. Prop. 5 Paper Patterns of Garments	Theory of req. Rules		Euc., Bk. I., Props. 5 & 7. Paper Patterns of Garments		
	3		Winds			Square Root Simple Practice		Euc. Bk. I., Props 33, 34. Paper Patterns of Garments	Mensuration of Triangles. Abstract Vulg. Fract.		Euc., Bk. I 35 36 Paper Patterns of Garments		
Wednesday	1	History from 787 to 901 A.D.	English from Text-book	Reading Aloud	Revise History	Prefixes, Roots, or Affixes	Study Model Answers	History from 901 to 1012 A.D.	Literature, Repetition, and Writing	Any Advanced Work	Dynastic Tables	Composition or Paraphrasing	Study Model Answers
	2	History from 1189 to 1216 A.D.			History from 1216 to 1270 A.D.			History from 1270 to 1307 A.D.			History from 1307 to 1327 A.D.		
	3	History from 1572 to 1602 A.D.			History from 1602 to 1624 A.D.			History from 1624 to 1637 A.D.			History from 1637 to 1649 A.D.		
Thursday	1	Geography of British North America	Compound Practice	Literature, Repetition, and Writing	Geography of British North America	Dates from 410 to 787 A.D.	Composition or Paraphrasing	Geography of Scotland	Metric System	Lives of Historical Personages	Geography of Sco land	Multip. of Algebra Stocking-hole Mending	Literature, Repetition, and Writing
	2	Geography of India	Division into prop. parts. Proofs of Vulg. Fract. rules		Geography of Europe	Dates from 1189 to 1270 A.D.		Geography of Europe			Geography of Europe	Easy Algebraic Factors Print Patch	
	3	Geography of Africa	Fourth Root		Geography of Africa	Dates from 1572 to 1624 A.D.		Geography of Africa			Geography of Africa	L.C.M. of Algebra Cross-cut Darn	
Friday	1	Problems in Addition and Subt. of Vulg. Fract.	Test Examination (See appended Questions)	Test Exam. (See appended Questions)	Simple Practice	Lives of Great Historical Personages	Any Advanced Work	Add. and Subt. of Decimals, Household Accounts	Test Examination (See appended Questions)	Test Exam. (See appended Questions)	Problems in Vulg. Fract. Diff. kinds of Fractions	Dates from 787 to 901 A.D.	Reading Aloud
	2	Method of Unity Vulgar Fractions of Money			Theory of Propor. Any abstract Vulgar Fractions			Averages Abstract Decimals			Averages Abstract Repeaters	Dates from 1270 to 1327 A.D.	
	3	Discount. Theory of Repeating Decimals			Stocks Money Decimals			Problems of Motion Compound Practice			Mensuration of Triangles. Abstract Decimals	Dates from 1624 to 1649 A.D.	
Saturday	1	Language	Physical Geography	Drawing / Music	Language	Physical Geography	Revise Dates / Music	Language	Physical Geography	Drawing / Music	Language	Physical Geography	Revise Dates / Music
	2												
	3												

(3) The Nom. form of *who* was wrongly written for the Objective or Dative form *whom*, when it preceded the Verb or Preposition, as

(*a*) *Who* of all the crowd did you know ?

(*b*) *Who* in the world did you give it to ?

Another ordinary defect was the employment of the comparative adjective instead of the comparative adverb, *e.g.*,

'He will thus learn it much *quicker*.' [more quickly.]

In *Spelling* we are sorry to say that many gross errors were perpetrated, the plural of the compound word *tablespoonful* assuming all manner of varieties, instead of simply adding the *s*.

Pupil-teachers will do well to study the formation of the plurals of compounds.

Algebra.

(*a*) Young students are apt to deem this subject little else than a series of ingenious puzzles until they progress as far as equations. After this stage, their easy conquest of problems which baffle ordinary arithmetical methods convinces them of its utility.

Perhaps the following juvenile application of algebra may stimulate interest.

(*a*) Think of any number ; (*b*) add 2 to it ; (*c*) multiply the sum by the original number ; (*d*) add 1 to the product ; (*e*) extract the square root ; (*f*) take away the original number, and the answer is ONE.

Now what is the reason for this result, and what are the algebraical operations connected with it ?

(*a*) Any number $= x$; (*b*) 2 added to it $= x + 2$; (*c*) $(x + 2)\,x = x^2 + 2x$; (*d*) the addition of 1 makes this $x^2 + 2x + 1 = (x + 1)^2$; (*e*) its square root $= x + 1$; this root minus x = ONE. Q.E.D.

Questions upon this sort of *catch* are likely to be propounded.

It should be observed that the answer may be varied *ad libitum* ; *thus* :—

(*a*) Any number ; (*b*) add 4 to it ; (*c*) multiply the sum by the original number ; (*d*) add 4 to the product ; (*e*) extract the square root ; (*f*) take away the original number, and the answer is TWO.

> The following is an exercise of which we invite the algebraic solution. A postcard with answer, name, and address will suffice.
>
> (*a*) Think of a number ; (*b*) add 3 to it ; (*c*) multiply the sum by 1 more than itself ; (*d*) take away 12 ; (*e*) divide the remainder by the original number ; (*f*) subtract from the quotient the original number, and the answer is SEVEN.

The number of exercises of this kind is unlimited.

(*b*) The examinational fashion at present obtaining is to set questions *whose coefficients are all literal, e.g.* :—

If m men can build a wall x feet long, y feet broad, and n feet thick in a days, how many boys can build a wall z feet long, b feet broad, and c feet thick in d days, supposing one man equals q boys ?

The first thing to do is to express m men as mq boys. Then

$$\text{As} \quad \left.\begin{matrix} x \\ y \\ n \\ d \end{matrix}\right\} : \left.\begin{matrix} z \\ b \\ c \\ a \end{matrix}\right\} :: mq : \text{Ans.}$$

$\therefore$ As $dnxy : abcz :: mq :$ Ans.

$$\therefore \text{Ans.} = \frac{abcmqz}{dnxy}.$$

(*c*) What must be the value of m so that $x + 3y$ may be a factor of $x^2 + mxy + 6y^2$?

Now it is plain that $(x + 3y)(x + 2y) = x^2 + 5xy + 6y^2$; so that if $m = 5$, the question is answered.

But we may proceed more scientifically thus :—

$$\begin{array}{r|l} x + 3y & x^2 + mxy + 6y^2 \;\big(\; x + (m-3)\,y \\ & x^2 + 3xy \\ \hline & (m-3)\,xy + 6y^2 \\ & (m-3)\,xy + 3\,(m-3)\,y^2 \\ \hline & \big\{6 - 3\,(m-3)\big\}\,y^2 \end{array}$$

But, by hypothesis, there is to be no remainder.

$$\begin{aligned} \therefore\ 6 - 3\,(m-3) &= 0 \\ 6 - 3m + 9 &= 0 \\ -3m &= -15 \\ m &= 5.\text{—Ans.} \end{aligned}$$

Needlework.

Every girl pupil teacher should most carefully study those portions of the recent Scholarship articles which deal with the ordinary faults committed by the scholars in practising this subject.

Not only will this attention repay, as far as regards their own handiwork and their practical proficiency as teachers, but it will largely assist in their future school-management ordeals.

Although the present system of education is, we hold, radically wrong in being essentially bookish, and in failing to train the faculties required in actual life, yet girls have, as regards the subject of needlework, been from the first better educated than lads. Moreover, now that the nation and the Department are beginning to recognise their failures in the past, and are commencing to place handicraft in its proper position, it is assured that plain needlework, never entirely neglected, will occupy a more and more prominent and deserved position.

Writing.

It is astonishing how few pupil-teachers write well ; that is to say, with (*a*) ease, (*b*) legibility, (*c*) accurate proportions of letters, and (*d*) artistic style.

The slant of the letters is often not parallel, the dimensions of the long letters are incorrect, the joinings are clumsy, the width is irregular, and the elements of each letter are unknown or neglected. Avoid, as you would ugliness, the upright style.

Every one of our readers should be familiar with Hughes's 'Art of Handwriting,' and should practise in Hughes's 'Pupil Teachers' Copy Book.'

Language, Science, Music, and Drawing.

It is to be hoped that no one is neglecting these subjects. We have nothing fresh to say about them, and they are only again introduced in the hope that our persistency and importunity may yet awaken and arouse and incite to action and achievement some of the more somnolent and sluggish.

These subjects with their extra marks often make all the difference between a First and a Second, or a Second and a Third Class.

As far as *Language* is concerned, we aver that no one can properly understand the constructions and beauties of his mother tongue without a knowledge of another language. We confess to a predilection for Latin in the case of boys, and French for girls.

A *Science*, such as Physiography, materially aids the Physical Geography required from the teacher throughout his training, assists in ordinary Geographical Teaching and Object Lessons, and enlarges

his ideas concerning the circumstances of his environment.

We believe in the Tonic Sol-fa system of *Music*, but much in the same way as we believe in the Kindergarten. It should be the handmaid of the less attractive Staff Notation.

From the Tonic Sol-fa score it is certainly not so easy to play, and there should not be a single P. T. in the land who is not a fair executant upon some instrument or other. Therefore, all should have at least an elementary knowledge of the 'Old Notation.'

Drawing is most useful almost universally. A properly trained teacher should be able to give a rough sketch on the blackboard of *anything* that he wishes to depict or explain.

At present, in the matter of Drawing, we are in the swaddling-bands of South Kensington, with its conventional and formal exercises that agree neither with nature, nor with beauty, nor with the evolution of Drawing, nor with the dicta of such thinkers as Herbert Spencer.

Our candidates will find themselves well repaid if they occasionally break away from authority and draw for themselves, animals, trees, and faces, and indulge in a little landscape sketching. Theirs, then, will be the fresher mind, the livelier fancy, the more observing eye, and the freer pencil.

(*N.B.—For Correspondence, see end of Certificate Article.*)

FIRST YEAR.

1. *Boys.*—If 24 rupees are worth 42 shillings, and 25 francs are worth £1, change 1,000 rupees into francs.

Ans. 2187½ francs.

Girls.—Add together—

acrs.	rds.	poles.
17	3	$27\frac{3}{4}$
19	2	$35\frac{1}{4}$
111	1	$17\frac{7}{10}$
23	0	$11\frac{1}{14}$
14	3	$10\frac{8}{11}$
17	1	$8\frac{7}{30}$

Show the working.

Ans. 204 acres 0 roods $30\frac{1}{4}\frac{3}{3}$ poles.

2. Write down the two methods of dividing a fraction by a whole number, and show that they must produce similar results.

3. Write in large hand the words, '*Physical Education.*'
Write in small hand the words, '*Rolling stones gather no moss.*'

4. Analyse the following passage, and parse the words in italics :—

'*Ruin*, *seize* thee, ruthless *King!*
Confusion on *thy* banners *wait!*
Though fanned by *Conquest's* crimson *wing*
They mock the *air* with *idle* state.

5. Write a letter describing a *Thunderstorm.*

6. What is the difference between Prepositions and Conjunctions, Prepositions and Adverbs, Adverbs and Relative Pronouns?

7. Draw sketch maps of the Yorkshire Ouse and the Tyne.

8. Where and what are John O' Groats, Paramatta, Three Rivers, Fitzroy, Giant's Causeway, The Trossachs, and Allen.

9. Enumerate, giving instances, the different kinds of river sources.

10. Account for the rapid fusion of the Danes and Saxons.

11. What was the Saxon method of investigating guilt?

12. What are the chief uses of the bar or measure in music?

13. How would you teach children to add?

14. Decline *leo* and *mare*; OR, state how the Feminine Gender and Plural Number are formed in French.

SECOND YEAR.

1. *Boys.*—A house depreciates in value each year at the rate of 10 per cent. of its value at the beginning of the year, and its value at the end of three years has dwindled to £1,093 10s. What was its original value?

Ans. £1,500.

Girls.—A man spends $\frac{1}{10}$ of his money, and then earns 5s. He afterwards spends $\frac{1}{3}$ of what he then has, and finds he possesses 10s. 6d. How much had he at first?

Ans. £1 4s.

2. Square 58,791, and prove the result by casting out the nines.

Ans. 3,456,381,681.

3. Writing as in First Year.

4. Name the mountain ranges, with the rivers flowing therefrom, radiating from St. Gothard.

5. Mention, with their capitals, the chief native states of Hindostan.

6. Draw a map of Italy, showing the chief towns, and character of soil and occupations.

7. Paraphrase the following :—

Music the *fiercest* grief can *charm*,
And *fate's severest* rage disarm ;
Music *can* soften pain *to ease*,
And make despair and *madness please ;*
Our *joys below* it can improve,
And antedate the bliss above.

8. Analyse the foregoing excerpt, and parse the italicised words.

9. What affixes are employed in the following words? Give their meanings, and another instance of their use. *Brigade*, *terrify*, *homage*, *subtle*, *adversary*, *equestrian.*

10. What wars were closed by the treaties of Winchester, Mise of Lewes, Troyes, Pecquigny, and Bretigny?

11. What do you know of the Constitutions of Clarendon, and the Provisions of Oxford?

12. *Boys.*—Write out Euclid I. 16. Any two exterior angles of a triangle are together greater than two right angles.

Girls.—Draw a pattern of a woman's night-gown (quarter-size), on sectional paper.

13. Write out the Subjunctive Mood of *Apercevoir*, OR, decline *Jupiter*, and *Jusjurandum.*

14. Write out the major scales of F♯, A♭, and F ; OR, the various forms of six and nine pulse measure.

THIRD YEAR.

1. *Boys.*—How much paper, ¾-yard wide, will be required for a room 22 feet long, 14 feet wide, and 9 feet high, there being two windows and two doors, each 6 feet by 3 feet?

Ans. 85½ yards.

Girls.—Three men—A, B, and C—rent a field for £80 ; A puts in 56 horses for 12 days, B 64 horses for 15 days, and C 80 horses for 18 days. Find how much each should pay.

Ans. A, £17 10s. ; B, £25 ; C, £37 10s.

2. What do you mean by Compound Ratio and Inverse Proportion? Write down three *different kinds* of sums in Inverse Proportion.

3. Writing as in First Year.

4. Account for the Labrador and Japan currents, and the Sargasso Sea.

5. Describe the basins of the Niger and Zambesi.

6. Draw a map of Mediterranean Sea.

7. Paraphrase the following :—

'*Lay* thy bow of pearl *apart*,
And thy crystal *shining* quiver,
Give unto the *flying hart*
Space to breathe *how short soever.*
Thou that mak'st a day of night
Goddess excellently bright.'

8. Analyse the preceding lines, and parse the words in italics.

9. Of what origin is the suffix of the word '*Goddess?*' Mention other endings which indicate the Feminine Gender.

10. Describe Henry VIII.'s attitude towards ecclesiastical reform.

11. Write short accounts of Sir Walter Raleigh and Lord Bacon

12. Write out Notes of a Lesson on Percentages.

13. Conjugate the verb *Dire*, OR *Fio.*

14. *Boys.*—Write out Euclid I. 42.
Construct a parallelogram that shall be equal in area and perimeter to a given triangle.

Girls.—What are the most commonly recurring faults in diagonal darning?

15. *Boys.*—

$$x + y + z = 30$$
$$8x + 4y + 2z = 50$$
$$27x + 9y + 3z = 64$$

Ans. $x = \frac{3}{4}$; $y = -7$; $z = 36\frac{1}{4}$.

Girls.—Mention some suitable beverages for invalids, and say how you would concoct any one of them.

16. *Boys.*—Each side of a rhombus is 32 feet, and each of the larger angles is twice each of the smaller angles. Find the area.

Ans. 886·8 sq. ft.

Girls.—What are the ordinary duties of a housemaid? Plan out a week's work.

17. Define *music*, *noise*, *rhythm*, *accent*, *syncopation*, and *pitch.*

THE 1892 SCHOLARSHIP EXAMINATION.

BY DR. GEORGE BEACH, M.A.,

Co-Author of 'A Manual of our Mother Tongue,' 'A Girls' Arithmetic,' Author of 'Elements of English,' 'Entertaining Readers,' etc.

I. HISTORY, 1887-9 (*Continued.*) Chiefly from Whitaker's Almanac.

(*a*) GENERAL EVENTS.

December, 1887.—Lord Mayor of Dublin sentenced to two months' imprisonment for publishing reports of suppressed meetings of the National League. New Constitution for Malta promulgated.

January, 1888.—*Times* newspaper entered its second century. Centenary of New South Wales celebrated. Mr. C. Graham, M.P., and Mr. Burns convicted for taking part in an assemblage in Trafalgar Square.

February.—Mr. Pyne, M.P., and Mr. Gilhooly, M.P., arrested at the House of Commons. Canadian Fisheries Commission at Washington sign a treaty.

March.—British force captured the Thibetan post of Lingtu.

April.—Commencement of Whitechapel murders.

May.—Mr. W. O'Brien, M.P., sentenced to three months' imprisonment. Mr. Dillon, M.P., sentenced to six months' imprisonment.

June.—School of Handicraft opened at Toynbee Hall, Whitechapel, by Sir W. Hart-Dyke, M.P.

July.—Tercentenary of defeat of Spanish Armada celebrated.

August—United States Senate refused to ratify the Fisheries' Bill. Abolition of Sugar Bounties.

September.—The Imperial British East Africa Company founded. Special Commission appointed to consider the charges made by the *Times* against Mr. Parnell.

October.—Portion of New Guinea annexed.

November.—Express train ran through from Paris to Constantinople.

December.—Defeat of Arabs near Suakim by the British. Suez Canal Convention ratified.

January, 1889.—Terrific cyclone in Pennsylvania.

February.—Mr. Cox, M.P., and Mr. Tully sentenced to four months', Mr. O'Brien to six months', and Mr. Kilbride, M.P., to three months' imprisonment under the Crimes' Act.

March.—Mr. Pigott, chief witness (and forger) against Mr. Parnell, committed suicide. Death of John Bright.

April.—It was decided that women are not eligible for election to County Councils.

May.—Mr. Conybeare, M.P., sentenced to three months' imprisonment.

June.—Sad disaster to excursion train from Armagh to Warren Point; 70 children killed.

July.—Visit of Shah of Persia. Victory over dervishes at Arguin. Dr. Tanner, M.P., sentenced to one month's imprisonment with hard labour.

August.—Victory over dervishes at Toski.

September.—Dock labourers' strike of a month terminated by the granting of a rise from fivepence to sixpence per hour. Mr. W. Redmond, M.P., sentenced to three months' imprisonment for conspiracy.

October.—Serious earthquake in Cornwall.

November.—Forth Bridge completed. Brazilian emperor deposed and Republic declared.

December.—Portuguese aggression in the Makololo country.

PARLIAMENTARY RECORD, 1887-9.

1888.—Parliament met on 9th February, and the principal features of the session were the passing of the new Rules of Procedure, the Local Government Bill, the Conversion of the National Debt Bill, and the prominence given to Labour questions.

The Irish question again occupied considerable time and attention, but on almost every point the Unionist Government was supported by very substantial majorities. The Channel Tunnel Bill was rejected by a majority of more than 140: but Mr. Bradlaugh's resolution, asking for a Select Committee to inquire into and revise the entire system of pensions, was agreed to.

1889.—The Parliamentary Session of 1889 was not fruitful of great debates, and perhaps on this account a considerable amount of legislative work was accomplished. Undoubtedly the principal measure was the Naval Defences' Bill, which authorised, during the next seven years, an expenditure of 21½ million pounds upon the construction of eight first and two second class battleships, nine first-class and thirty-three smaller cruisers, and eighteen torpedo gunboats.

In addition, the Scotch Local Government Bill, the Irish Light Railway Bill, the Bill to establish a Board of Agriculture, the Welsh Intermediate Education Bill, and a Bill to facilitate the provision of Technical Instruction, became law.

(*To be continued.*)

(*b*) *Aldermen*.—Next in order after members of the Saxon royal family (or Ethelings), were the *aldermen* or *earls*. The districts which they governed were denominated shires, and, although small at first, were afterwards enlarged to the extent of our present counties. At the accession of Canute the title *jarl* (or *earl*) was substituted for *ealdorman*, and his policy, continued by the later Saxon monarchs, added still further to their authority by comprising several shires within the same earldom.

Had not William the Conqueror reversed this policy, the devolution of England as a united nation would have been, as in the case of France, much longer postponed; and the central authority, upon which cohesion at that time depended, would have been greatly reduced. In modern times the term *aldermen* has been resuscitated, and is now applied to those members of the county and borough councils, who have not been elected by the suffrages of their fellow-citizens, but co-opted to their position by the votes of the councillors themselves.

(*c*) It is time now that dates, and in fact all memory work, be taken seriously in hand (or rather in head). These, together with dynastic tables, tables of campaigns, provisions of statutes, should now be ready for use.

When writing out the two former, much greater credit will be secured by also inserting the proper dates.

(*d*) *Justice in Eyre*, a term that has puzzled many, simply means *Justice in itinere*, or a judge who goes on circuit.

(*e*) The following ranks are members of the House of Lords, arranged in due order of precedence.

(1) Dukes, Princes of the Blood, (2) Archbishops, (3) Dukes, (4) Marquises, (5) Earls, (6) Viscounts, (7) Bishops, (8) Barons.

The two archbishops are:—

Canterbury—Edward White Benson, D.D.

York—William Dalrimple Maclagan, D.D.

The senior dukedom is that of Norfolk, dating from 1483; the senior marquisate that of Winchester, 1551; the senior earldom that of Shrewsbury and Talbot, 1442; the senior viscountship that of Bolingbroke and St. John, 1712; the senior barony that of Le Despencer, 1264. The bishops are the only 'life-peers.'

(*f*) The present Cabinet consists of:—

Prime Minister	Marquis of Salisbury.
Lord High Chancellor	Lord Halsbury.
Lord President of Council	Viscount Cranbrook.
Lord Privy Seal	Earl Cadogan.
Chancellor of Exchequer	George J. Goschen.
Home Secretary	Henry Matthews.
Foreign Secretary	Marquis of Salisbury.
Colonial Secretary	Lord Knutsford.
War Secretary	Hon. Edwd. Stanhope.
First Lord of Admiralty	Lord George F. Hamilton.
Indian Secretary	Viscount Cross.
First Lord of Treasury	Arthur J. Balfour.
Lord Chancellor of Ireland ...	Lord Ashbourne.
Irish Secretary	William L. Jackson.
President of Board of Trade ...	Sir Michael Hicks-Beach.
Chancellor of Duchy of Lancaster ...	Duke of Rutland.
President of Local Government Board	Charles F. Ritchie.
President of Board of Agriculture ...	Henry Chaplin.

(*g*) *Administrations during the present reign* :—

Premier.	*Date of commencement.*
Viscount Melbourne	April 18th, 1835.
Sir Robert Peel	Sept. 6th, 1841.
Lord John Russell	July 6th, 1846.
Earl of Derby	Feb. 27th, 1852.
Earl of Aberdeen	Dec. 28th, 1852.
Lord Palmerston	Feb. 10th, 1855.
Earl of Derby	Feb. 25th, 1858.
Lord Palmerston	June 18th, 1859.
Earl Russell	Nov. 6th, 1865.
Earl of Derby	July 6th, 1866.
Benjamin Disraeli	Feb. 27th, 1868.
William E. Gladstone	Dec. 9th, 1868.
Earl Beaconsfield...	Feb. 21st, 1874.
William E. Gladstone	April 28th, 1880.
Marquis of Salisbury	June 24th, 1885.
William E. Gladstone	Feb. 6th, 1886.
Marquis of Salisbury	Aug. 3rd, 1886.

Blanchard's *Notabilia of English History* (price one shilling) will be found very serviceable for dates, statutes, battles, biographies, etc.

II. ARITHMETIC.—

(*a*) The interest of a sum of money for 9 months is £30 18s. The discount is £30. Find the sum.

There are several methods of solution ; the following seems the plainest :—

Let P = Principal, I = Interest, W = Present Worth, D = Discount.

Then as P : I : : W : D
∴ as P : W : : I : D
∴ as P : P–W : : I : I–D.

But Principal *minus* Present Worth = Discount.
∴ as P : D : : I : I–D
or as I–D : I : : D : P
∴ as 18s. 0d. : £30 18s. : : £30 : P
as 18 : 618 : : £30 : P
3 : 103 : : £30 : P
1 : 103 : : £10 : P
∴ P = £1,030 Ans.

(*b*) *Stock Problems* often form a prominent feature of the Arithmetical Test, yet, as a rule, they are studied unsystematically, instead of being properly graduated. The subjoined is a methodical order of proceeding to their vanquishment.

(1) *Given* amount of Stock and Interest of Stock, *to find* Income.
(2) „ Cash and Price of Stock, *to find* amount of Stock.
(3) „ Cash and Price of Stock and Interest of Stock, *to find* Income.
(4) „ Cash and Price of Stock and Interest of Stock, *to find* Interest on Cash.
(5) „ Amount of Stock and Price of Stock, *to find* Cash.
(6) „ Yearly Income and Interest of Stock, *to find* amount of Stock.
(7) „ Yearly Income and Interest of Stock and Cash, *to find* Price of Stock.
(8) „ Yearly Income and Price of Stock and Cash, *to find* Interest of Stock.
(9) „ Yearly Income and Price of Stock and Interest of Stock, *to find* Cash.
(10) „ Interest of Stock and Actual Rate of Interest, *to find* Price of Stock.
(11) „ All the above classes of Problems complicated by introduction of Brokerage, Income Tax, etc.
(12) „ Duplex Problems as to comparison of Gain or Loss in Cash, Amount of Stock, Rate of Interest, and Annual Income.

III. GEOGRAPHY. ANALYSES OF QUESTIONS FOR LAST 10 YEARS.

Maps.—There has never been less than a choice of three maps, out of which one must be selected.

England has been given four times, Scotland twice, Ireland three times, Spain four times, Italy three times, France once, Mediterranean Sea once, India four times, North America three times, Australia three times, New Zealand twice, and Cape Colony once.

Except in 1882, of the three maps one has been British, another European, and the third always at least partially Colonial. Diagrams of the planetary system have also been requested.

Physical Geography.—Never less than one, on three occasions two, and once only have three questions been devoted to this branch.

Particulars respecting Mountains, Rivers, Tides, Currents, Deltas, Climates, Winds, Eclipses, Astronomical terms, with illustrative diagrams have been required.

Mathematical Geography.—Latitude, Longitude, Difference of Time.

British Isles.—One question always, and sometimes two appear.

Voyages.—Nearly every year some typical voyage has to be described.

The Colonies and Interchange of Productions have generally one question each.

Miscellaneous Questions are mostly upon historical associations, race, religion, noted buildings, and those of the 'Where and what' type.

One *Notes of a Lesson* has invariably been lately introduced.

(*b*) For interesting, and yet very profitable reading, much of which may bear directly upon Scholarship Questions, the following books of Messrs. Cassell and Co. can be highly recommended :—'Round the Empire,' 'This World of Ours,' 'The Citizen Reader.'

SELECTED GOVERNMENT QUESTIONS.

FIRST WEEK.

1. Classify the English conjunctions and show that they are frequently derived from Verbs.

2. Analyse the following lines and parse the italicised words :—

There at the foot of *yonder nodding* beech
That wreaths its old fantastic *roots so high*,
His listless *length* at noontide *would he* stretch,
And *pore* upon the brook that *babbles by*.

3. State briefly the causes of the difference between Spring Tides and Neap Tides.

4. Draw a Map of France, showing the principal physical features, and twelve principal towns.

5. Write notes of a lesson on the Mediterranean Sea.

6. State shortly the circumstances in which the following places became part of the British Empire :—Jamaica, Bombay, Gibraltar, Hong Kong.

7. Give as clear an account as you can of *any two* of the following popular uprisings :—*The Pilgrimage of Grace*, Jack Cade's Rebellion, The Risings in the time of Edward VI., The Luddites.

8. After a class has reproduced in writing a short story which you have previously read to them, what is your method of revising the exercise ?

9. Explain any way you know of making clear *to the eye* the process called multiplying $\frac{2}{3}$ by $\frac{1}{4}$.

10. Place time signatures before the following three passages :—

OR,

Write a phrase in three-pulse measure, a phrase in four-pulse measure in secondary form, and a phrase in six-pulse measure, with one or two silent pulses

11. Write the pulse signs for four different kinds of measure

OR,

Rewrite the following in $\frac{3}{4}$ time, halving the value of every note and rest :—

SCHOLARSHIP ROUTINE FOR JUNE, 1892.

DAYS	FIRST WEEK			SECOND WEEK			THIRD WEEK			FOURTH WEEK		
	First Hour	Second Hour	Third Hour	First Hour	Second Hour	Third Hour	First Hour	Second Hour	Third Hour	First Hour	Second Hour	Third Hour
MONDAY	Problems leading to Quadratics — Ordinary Faults in Needlework	History from 1856 to 1867	Language	Algebraic Factors — Uses of Food, Constituents of Food-Stuffs	Dates from 1867 to 1892	Language	Problems leading to Quadratics — Ventilation Drainage	England under the Stuarts	Language	Simultaneous Equations — Miscellaneous English	England under the Stuarts	Language
TUESDAY	First 26 Propositions of Euclid, Book I. — Knitting	Political Geography of North America	Music	Euclid, Book II. — Patterns of Boy's Shirt and Woman's Nightgown	General Geography of Europe	Music	Props. 27 to 48 Euclid, Book I. — Patches	General Geography of Africa	Music	Euclid, Book II. — Patches	The Planetary System	Music
WEDNESDAY	L.C.M. and G.C.M. Problems	Latin Affixes	How to teach Drawing	Mensuration — Stocks	Greek and Teutonic Affixes	The Value of Teaching 'Handicraft'	Clock Sums	Tables of the Parts of Speech	The Requirements of the Code for the Standards	Problems of Motion	Tables of the Parts of Speech	The Qualities of a Good Series of Reading Books
THURSDAY	Problems leading to Quadratics — School Penny Banks	History from 1867 to 1892	Paraphrasing and Parsing	Algebraic G.C.M. and H.C.F. — Recipes for Ordinary Puddings	England under the Tudors	Analysis and Parsing	Cube and Square Root of Algebra — How to Wash Flannels, Muslins and Laces	England under the Tudors	Paraphrasing and Repetition	Simultaneous Equations (Problems) — Miscellaneous English	Revise any Dates	English Grammar from Text-book
FRIDAY	Notes on Euclid, Book II. — Calico Sampler	Map of Southern States of North America	Averages and Percentages	Deductions on Euclid, Book I. — Flannel Sampler	General Geography of Australia	The Metric System	Deductions on Euclid, Book II. — Diagram of Chemise	The Seasons	Mixtures	Notes on Euclid, Book I. — Diagram of Nightshirt	Map of Australia	Mixed Vulgar and Decimal Fractions
SATURDAY	Language / Music / Any Revision / English Composition			Language / Music / Any Revision / Repetition, Literature, and Penmanship			Language / Music / Any Revision / English Composition			Language / Music / Any Revision / Repetition, Literature, and Penmanship		

12. (*Men only.*) How long will it take a person to walk round a square field, the area of which is 28 acres, 4,356 yards, at 4½ miles per hour? Ans. 11 mins. 20 secs.

13. A merchant gains 20 per cent. on one-fourth of his capital, 40 per cent. on one-third, and loses 24 per cent. on the remainder. What is his gain or loss per cent? Ans. 8½ per cent.

14. What is the price of 3 per cent. stock, when a sum of £4,353 4s. 7d. invested in it will produce £132·25 income. (Omit brokerage.) Ans. 98¾.

15. (*Men only.*) Write out Euclid I. 24. Show the necessity of the words '*Of the two sides DE, DF, let DE be the one which is not the greater.*'

(*Women only.*) Describe the method by which you would teach a child the right way to darn a hole in the foot of a coarse worsted sock.

16. (*Men only.*) Write out Euclid II. 11. On a given straight line AB as hypothenuse describe a right-angled triangle ABC such that if CD be drawn perpendicular to AB, AC shall be equal to BD.

(*Women only.*) Say what you consider to be (*a*) the most wholesome, and (*b*) the cheapest method of using a shoulder of mutton for a cottage Sunday dinner. Give reasons.

17. (*Men only.*) The side of a square is 12 feet. The square is divided into three equal parts by two straight lines parallel to the diagonal. Find the perpendicular distance between the parallel straight lines. Ans. 3·114 feet.

(*Women only.*) Write notes of a lesson on '*Clothing*' to a First Class.

18. (*Men only.*) Extract the square root of $x^4 - 6x^3 + 4ax^2 + 9x^2 + 6ax - 8$. Ans. $x^2 - 3x + 2a$.

(*Women only.*) What special subjects are included under the term '*Domestic Economy*'?

19. (*Men only.*) If two numbers differ by 2, show that the difference of their squares is twice their sum.

Second Week.

1. Write a short essay upon '*Closer union with our Colonies.*'

2. Analyse the following sentences, supplying the words that are understood:—

(*a*) She reads slowly but very distinctly.
(*b*) He is taller than I.
(*c*) Come as soon as possible.
(*d*) I noticed the creature he spoke of.
(*e*) On account of my walk, am very tired.

3. Draw a map of Scotland, noting therein the physical features only.

4. Name some country in the same latitude as England, and compare the climate, people, and productions with those of our own country.

5. What is the Solar System? Draw a diagram to illustrate your answer.

6. Give a short sketch of the reign of Alfred, and show what special claims he had to the title of '*Great.*'

7. Name three marriages of English kings which had an important effect upon the history of this country; and in each case show what that effect was.

8. Give some hints for making oral exercises in Arithmetic interesting.

9. In what ways may success in Class Teaching be promoted by studying the characters of children?

10. Give the signatures of the keys of D, G, F, and B♭; OR,
Write the names of the respective *Dohs* when *Lah* is B, D, G; and the names of the *Lahs* in the keys D, F, B♭.

11. State what minor keys are shown by the following signatures, 4 flats, 3 sharps, 5 sharps, 1 sharp, 2 flats, 5 flats; OR,
Rearrange the following in order of pitch, placing the highest notes first:—

fe s, r l t, d' s l, fe, m d r' t.

12. (*Men only.*) Find the square root of 4·624. Show that the process is based upon the algebraic formula $(a + b)^2 = a^2 + 2ab + b^2$. Ans. 68.

13. Two men take steps of $2\frac{11}{12}$ and $2\frac{7}{10}$ feet. If they start in step and walk side by side, how far will they have walked, and how many steps will they have taken, before they are in step again?
Ans. 62⅓ yards; 64 steps.

14. (*a*) *Prove*, as to children beginning addition of fractions, that $2\frac{4}{15} + 3\frac{2}{5} = 5\frac{2}{3}$.
(*b*) Define *factor, prime number, multiple, and true discount*, giving examples. Which is greater, the discount on a sum due in a certain time, or the simple interest on the sum for that time, the rate per cent. being the same?

15. (*Men only.*) Write out Euclid I. 8. The diagonals of a rhombus bisect each other at right angles.
(*Women only.*) Write out rules for *one* method of putting a patch into a piece of linen. Name the other methods.

16. (*Men only.*) Write out Euclid II. 6. Produce a given straight line, so that the rectangle contained by the whole line thus produced and the part produced may be equal to a given square.
(*Women only.*) By what means are fevers commonly caused and propagated? Explain the benefit of pure fresh air in cases of illness.

17. (*Men only.*) The parallel sides of a trapezoid are respectively 16 and 20 feet, and the perpendicular distance between them is 5 feet. When the other sides are produced to meet, find the perpendicular distance of the point of intersection from the longer of the two parallel sides. Ans. 25 feet.

(*Women only.*) Give a few simple directions upon the way to make starch, and to iron linen collars and cuffs.

18. (*Men only.*) Solve the equation

$$\left.\begin{aligned} x^2 + xy &= 15 \\ xy - y^2 &= 2 \end{aligned}\right\} \qquad \text{Ans. } x = \pm 3 \text{ or } \pm\frac{5}{\sqrt{2}}$$

$$y = \pm 2 \text{ or } \pm\frac{1}{\sqrt{2}}.$$

(*Women only.*) What would be the cost of an outfit for a girl of thirteen years of age? Make out a bill of particulars.

19. (*Men only.*) What is the price of eggs per dozen, when two less in a shilling's worth raises the price one penny per dozen?
Ans. 8d.

Third Week.

1. Write notes of a first lesson on Participles.

2. Give the meanings of the prefixes *extra-, ob-, be-, for-, anti-*. What do the suffixes *-ster, -ish, -ant, -let, -al* denote respectively? Give an example in each case.

3. Give brief explanations of the terms Sahara, Deccan, Plateau of Thibet, and Great Karoo.

4. Describe a trip by steamer from London to Newcastle, OR from Glasgow to Liverpool, giving a sketch map.

5. Name the principal productions of six of the chief colonies of Great Britain and describe their climates.

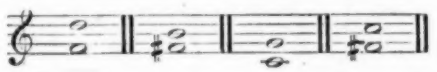
6. The Danish invasion of England may be divided into three periods, in each of which the invaders came with a different object. Name each, giving a few essential details.

7. Give a short account of any *five* of the following:—*Thomas Cromwell, Duke of Marlborough, Hubert de Burgh, Bolingbroke, John Wilkes, Burke, Drake, Humphrey, Duke of Gloucester, Wilberforce.*

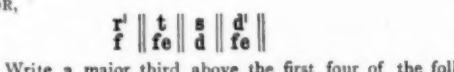
8. Give a short list of the different kinds of books which you would expect ordinary boys and girls to be able to read by themselves immediately after quitting the day school at the age of thirteen. Mention some good books which you think are rather too difficult for children.

9. In preparing a lesson upon a comparison between the present condition of Great Britain and that of France state what classes of facts you would wish to procure, and in what books you would seek them. Give an example of a sketch which would exhibit your facts in tabular form on the blackboard.

10. Write under each of the following pairs of notes its name (second, third, etc.,) and quality (major, perfect etc.)



OR,



11. Write a major third above the first four of the following notes, and a minor sixth above the last four:—

OR,

Describe the intervals formed by the following pairs of notes :—

d'	m'	ta	d'	se	f
m	f	r	re	t_1	de

12. (*Men only.*) What is the length of the side of a square field containing six acres? Give the answer in feet correct to three places of decimals. Ans. 511·233... sq. ft.

13. The total area of three estates is 3,536 acres. If the area of the second and third estates be respectively two-thirds, and three-fifths that of the largest, find the difference in size between the first and third. Ans. 624 acres.

14. At an examination in which the maximum marks were 1,000, A got 20 per cent. more than B; B 10 per cent more than C; C 20 per cent. less than D. If A secured 660, what percentage of full marks was obtained by D? Ans. 62·5.

15. (*Men only.*) Write out Euclid I. 16. Prove from this Proposition that in any triangle only one angle can be a right angle or an obtuse angle.

(*Women only.*) Describe how you would teach a child to mend a tear made across a child's frock.

16. (*Men only.*) Write out Euclid II. 9 and II. 10, without using any construction.

(*Women only.*) Describe fully the injuries done to health by neglect of personal cleanliness.

17. (*Men only.*) Find the side of an equilateral triangle, so that the area may be 100 sq. ft. Ans. 15·197 ft.

(*Women only.*) Describe the differences between oxygen, nitrogen, and carbonic acid gas.

18. (*Men only.*) Think of a number; add two to it; multiply the sum by the original number; add one to this product; extract the square root; take away from this root the original number. Prove that the answer is always ONE.

(*Women only.*) Write out a receipt for making a baby's sock.

19. (*Men only.*) It is between two and three o'clock. A person looking fancies that it is 55 minutes earlier than it really is, through mistaking the big for the little finger. What is the actual time? Ans. $5\frac{5}{11}$ mins. past 2.

FOURTH WEEK.

1. Write a letter descriptive of the town or village in which you live, or of any famous building in or near it.

2. Give examples of English words in which differences of (*a*) Case, (*b*) Number, (*c*) Gender, (*d*) Degree, (*e*) Mood, (*f*) Tense, (*g*) Voice are indicated by changes in the word itself.

3. Draw a Map of Italy.

4. In what part of the British Isles are there to be found *lead, slate, granite, building-stone, peat, china clay,* and *medicinal springs.* Give names and describe positions as accurately as you can.

5. How are the seasons caused? Explain the phenomenon of twilight.

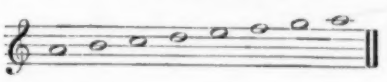
6. Arrange in chronological order (giving the dates, if you can) ten battles fought on English soil, not mentioning more than one of any given series.

7. Mention some of the particulars in which you think great progress of any kind has been made during the reign of Her Majesty.

8. Write full notes of a lesson on a flour-mill *or* a steam-engine.

9. Draw a plan of the schoolroom with which you are most familiar, showing the position and relative sizes of desks and gallery. Explain the advantages and disadvantages of the arrangement.

10. Complete the following as a scale of A, and write out the scale of B♭.



OR,

Write a scale in the *Lah* mode, and one in the *Ray* mode.

11. Write the pitch names, and duration names of the following notes, and also the signs for rests of corresponding value :—

OR,

Re-write the following (*a*) doubling and (*b*) halving the value of every note and rest :—

s :—	: r	m :— . d	r . d : t_1 . d

12. (*Men only.*) Subtract the number whose square root is ·01 from the number whose square is ·01871424. Ans. ·1367.

13. At what rate per cent. per annum (simple interest) will £1,350 amount to £1,621 13s. 9d. in 5 years 9 months?
Ans. 3½ per cent.

14. (*a*) Explain clearly, as to a class of beginners, the method of subtracting 206 from 302.
(*b*) Prove that the G.C.M. of 90 and 102 is 6.
(*c*) Prove that a fraction is divided by a whole number when its denominator is multiplied by that number.

15. (*Men only.*) Write out Euclid I. 13. If two right-angled triangles have their hypothenuses equal, and also one side equal to one side, prove that the angles opposite to the equal sides are equal.
(*Women only.*) What method should be adopted to teach little children to fix their own needlework? Would a different system be adopted in the upper classes?

16. (*Men only.*) Write out Euclid II. 7. Comprise Euclid II. 5 and II. 6 in one enunciation.
(*Women only.*) Give an account of the best mode of washing (*a*) a flannel waistcoat, and (*b*) a linen shirt.

17. (*Men only.*) The radius of a circle is 7 feet. From a point 12 feet from the centre a straight line is drawn to touch the circle. What is its length? Ans. 9·75 feet.

(*Women only.*) Describe the special uses of linen, cotton, wool, leather, and silk, for purposes of clothing.

18. (*Men only.*) In the quadratic equation $x^2 + ax + f = o$, show that the sum of the roots $= -a$, and the product of the roots $= f$.

19. (*Men only.*)
$$3x + 4y = 2xy$$
$$4y + 3z = 3yz$$
$$6z + 5x = 4zx$$
Ans. $x = 4, y = 3, z = 2$.

(*Women only.*) What special care should be taken by those attending a sick room, *both* as regards the sick person and themselves?

(*N.B.—For Correspondence, see end of Certificate Article.*)

—o—

THE 1892 CERTIFICATE EXAMINATION.

BY DR. GEORGE BEACH, M.A.

Co-Author of 'A Manual of our Mother Tongue,' 'A Girls' Arithmetic,' Author of 'Elements of English,' 'Entertaining Readers,' etc.

I. REMARKS ON ROUTINE :—

FIRST YEAR.

(*a*) Parse *loud, high, each, seek, moment, Ladye's, tear, round, dark, then, deep, struggling, unaltered, thus, mood.* (First Friday.)

(*b*) Parse *right, well, that, full, such, be made, to aid, when, as, Harper, yet, how, which, Douglas', brooked, he, tax, wrong, call, untrue,* OR, *joy, that, something, yet, what, so, not, indeed, to be blest, liberty, busy, fluttering, raise, praise, outward, fallings, moving, about, about, realised.* (Third Monday.)

SECOND YEAR.

(*a*) Paraphrase Lines 86 to 101 of Scene 7, Act III. of 'King Lear' (Third Saturday.)

(*b*) Parse *some, else, could, beg, In, such, fellow, Which, man, worm, then, yet, scarce, heard, more, since, As, flies, we, their, How, be, Bad, play, Angering, itself, others, Bless, ay.* (Fourth Monday.)

(*c*) Paraphrase Lines 1 to 15 of Scene 3, Act IV. of 'King Lear' (Fourth Friday.)

II. BACON'S ANTITHETA.

ESSAY IX.

FOR.	AGAINST.
1. It is natural to hate the living reproach of one's own ill fortune.	1. Envy keeps no holidays.
2. Envy in a commonweal is a kind of wholesome ostracism.	2. Envy can be reconciled to virtue by nought but death.
	3. Envy tasks virtues, as Juno did Hercules.

ESSAY XI.

(*a*) *On office.*

1. Office is not the voting-pebble in the game of despots, but in that of providence.

2. Office gives publicity both to virtues and vices. It spurs the former and bridles the latter.

3. Nobody knows what progress he has made in the race of virtue until office gives him an arena.

4. Virtue moves violently *to* her place, but calmly *in* her place. Office is the place of virtue.

(*b*) *Command.*

(1) To enjoy happiness is a great blessing, but to be able to communicate it to others is a greater.

(2) Kings are unlike men but like stars. They have a great *influence*, not only on private persons, but on the very seasons of States.

(3) To resist the vicegerent of God is not only treason, but a kind of spiritual rebellion.

1. While we seek office we divest ourselves of freedom.

2. Office chiefly enables us to do those things which it is best not to desire, and next best to be unable to do.

3. In office, the ascent is toilsome, the standing slippery, and the downfall headlong.

4. Men in office, in order to be happy, must borrow the vulgar opinion respecting themselves.

(1) How wretched it is to have nothing to desire, and everything to fear!

(2) Like the heavenly bodies which have great honour but no rest, so are men in command.

(3) No man is admitted to the feasts of the gods, except to afford them sport.

III. SPECIMEN OF ANALYSIS (inserted by request).

'And *fast* the faithful clan around him *drew*
What time the warning note *was* keenly *wound*,
What time aloft their *kindred* banner flew,
While clamorous war-pipes yelled the gathering sound,
And while the fiery cross glanced *like* a meteor *round*.'

kindred—adj. of qual., incapable of comparison, qual. *banner* attributively.

like—adv. of manner, posit. deg., mod. *glanced*.

round—adv. of place (incapable of comparison), mod. [*glances*].

V. ALGEBRA.

(*a*) In any problem there must be as many equations as there are unknown quantities; for three unknowns, three equations; for four unknowns, four equations; and for n unknowns, n equations. These equations must be

(1) Not identities.
(2) „ inconsistent, and
(3) „ deducible from one another.

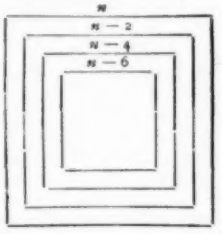
(1) $\frac{6x}{3} + 3\frac{1}{2} = x + \frac{3x + 10}{3}$ is an identity; for both sides are really alike.

(2) $\left.\begin{matrix} 5x + 2y = 10 \\ 10x + 4y = 15 \end{matrix}\right\}$ are inconsistent; for we can deduce that $20 = 15$.

(3) $\left.\begin{matrix} x + 2y + 3z = 6 \\ 2x + 3y + 4z = 9 \\ 3x + 5y + 7z = 15 \end{matrix}\right\}$ are not all independent, for the third equation is merely the sum of the other two.

(*b*) A common problem is that where men are formed first into a solid and next into a hollow square. These present little difficulty if it be remembered that (1) each successive inner square has two men less in its side than the square immediately enclosing it, and (2) the number of men in the perimeter of any square is not $4n$, but $4n - 4 = 4(n - 1)$; for each corner-man is in two sides.

Example.—An officer can form his men into a solid square, and also into a hollow square 12 deep, but in the latter case the front rank has in it 3 more men than the front rank of the solid formation. How many men are there in each square?



SENTENCE	KIND OF SENTENCE	SUBJECT		PREDICATE		OBJECT	
		Simple	Enlargement	Simple	Extension	Simple	Enlargement
A. And fast the faithful clan around him drew ..... glanced like a meteor round	Principal	clan	(and) the faithful	drew	around him What time the..... a meteor round		
A2. What time....keenly wound	Adv. Mod. *drew*	note	the warning	was wound	keenly what time		
A3. What time ..... banner flew	Adv. Mod. *drew*	banner	their kindred	flew	aloft what time		
A4. While clamorous ..... gathering sound	Adv. Mod. *drew*	war-pipes	(while) clamorous	yelled	while	sound	the gathering
A5. And while the ..... meteor round	Adv. Mod. *drew*	cross	(and while) the fiery	glanced	round like a meteor		
A5*b*. A meteor [glances]	Adv. Mod. *glanced*	meteor	a	glances			

IV. PARSING.

Fast—adverb of manner, posit. deg., mod. *drew*.

drew—verb, irreg. (strong), intrans., indic., past def., sing., 3rd, agrees with *clan*.

what—dem. adj., points out *time*.

was—verb, irreg. (*am*, *was*, *been*), intrans., indic., past, sing., 3rd, agrees with *note*, auxiliary of passive voice.

wound—verb, irreg. (strong), trans., pass., past partic.

was wound—verb. irreg. (strong), trans., pass., indic., past, sing., 3rd, agrees with *note*.

Let n = side of hollow square.
Then $4(n - 1)$ = number of men in its outer perimeter.
Then $4(n - 3)$ = number of men in its second perimeter.
Then $4(n - 5)$ = number of men in its third perimeter.
Then $4(n - 23)$ = number of men in its twelfth perimeter.

If p = the number of the ranks of any perimeter, then $4(n + 1 - 2p)$ = the number of men in the perimeter.

∴ Number of men in hollow square $= 4(n - 1) + 4(n - 3) + 4(n - 5) \ldots\ldots + 4(n - 23) = 4(12n - 144) = 48n - 576$.

But side of solid square $= n - 3$
$\therefore$ Number of men in solid square $= n^2 - 6n + 9$
$\therefore n^2 - 6n + 9 = 48n - 576$
$\therefore n^2 - 54n + 585 = 0$
$\therefore (n - 39)(n - 15) = 0$
$\therefore n = 39$ or 15
$\therefore$ Number of men in square $=$ 1,296 or 144 Ans. But 144 is inadmissible.

Second Method.—To find the number of men in a hollow square.
Number of men in front rank $= n$
$\therefore$ Number of men in second rank $= n - 2$
$\therefore$ Number of men in thirteenth rank $= n - 24$.
Now by first finding the number of men in a solid square of n side, viz. n^2.
By then finding the number of men in a solid square of $n - 24$ side, viz. $n^2 - 48n + 576$, and subtracting the second from the first we get $n^2 - n^2 + 48n - 576 = 48n - 576$ as in former method.

VI. EUCLID.

(*a*) A line is said to be divided externally when it is produced, thus if XY de produced to Z, XY is said to be divided externally in Z.

X Y Z

(*b*) The *mediant* of a triangle is the straight line drawn from its vertex to the middle point of the base.

(*c*) *Of all rectangles with the same perimeter the square has the greatest area.*

This very easy deduction has puzzled many. It follows at once from II. 5.

AC^2 is greater than rect. AD. DB by CD^2; but AC^2 has the same perimeter as rect. AD. DB, viz. 2AB.

A C D B

(*d*) From this it follows that if AB be bisected in C and any other points D, E, F, be taken in CB more and more remote from C, that AC^2, rect. AD. DB, rect. AE. EB, rect. AF. FB are in descending order of magnitude, although all of the same perimeter.

A
C D E F B

For $AC^2 = AD.\ DB + CD^2$
and $AC^2 = AE.\ EB + CE^2$
$\therefore$ AE. EB $+ CE^2 =$ AD. DB $+ CD^2$
but CE^2 is greater than CD^2
$\therefore$ AE. EB is less than AD. DB. etc. Q.E.D.

(*e*) If two circles intersect and the tangents to them from one of the points of intersection are at right angles to each other, the circles are said to intersect orthogonally.

The properties of such circles will well repay investigation.

(*f*) The connection between II. 6, II. 11, IV. 10 and IV. 11 should be carefully noted; and also between II. 14, III. 31, III. 35 (Case 1), VI. 8, and VI. 13.

SELECTED GOVERNMENT QUESTIONS.

FIRST YEAR.

SECOND WEEK.

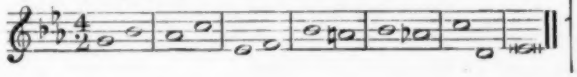
1. Write a large hand copy of '*Intellectual Atrophy.*'
Write a small hand copy of 'A spotless mind and innocent' 'Calls it a hermitage.'

2. Write from Dictation :—
'The cultivation of the attention is the secret of all intellectual training. Attention produces the more or less systematic grouping of representations and ideas, so that not one remains isolated within us, but each rather attracts and awakens similar or logically analagous images and ideas. Inattention, on the other hand, consists in the abortive birth of each representation excited within us, and which dies away without having given rise to a permanent grouping. Attention, therefore, is as much a question of method as of natural intellectual power.'

3. Explain Mulhauser's system of teaching writing. Compare the advantages of beginning the teaching of writing with large hand or text hand.

4. Write full notes of a lesson on *one* of the following :—The Severn ; Methods of Lighting ; Money ; The Camel.

5. Transpose the following into the key of D :—



OR,

The following passage is given in the keys of E, B, C, G, A ; **d t, r m d**. Which will sound highest and which lowest ?

6. Write notes corresponding in value to the following rests :—

OR,

State against each of the following tones of the major scale its relation, as noted by the terms dominant, tonic, etc., **f, d, s, m, l.**

7. State the various kinds of attributive adjuncts that may be employed, and give instances.

8. (*Men only.*) Analyse the following passage, and parse the words in italic :—

Well I *ween* the *charm* he *held*,
The noble ladye had *soon* dispelled ;
But she was deeply *busied* then
To tend the wounded Deloraine.
Much she wondered *to find* him lie
On the stone threshold stretched *along* ;
She thought *some* spirit of the sky
Had done the bold moss-trooper *wrong*,
Because, *despite* her precept dread,
Perchance, he in the Book had read ;
But the broken lance in his bosom *stood*,
And it was earthly steel and *wood*.

(*Women only.*)

Thou *art* with me *here* upon the banks
Of *this* fair river ; thou, my *dearest Friend*,
My dear, dear, Friend ; and in thy voice I catch
The language of my *former* heart, and read
My former pleasure in the *shooting* lights
Of thy wild eyes. *Oh ! yet* a *little* while
May I behold in thee *what* I was *once*,
My dear, dear, Sister, and this *prayer* I make,
Knowing that Nature never did *betray*
The heart *that* loved her.

9. '*The earth is borne along in the heavens by various movements, far more numerous and peculiar than most people would be inclined to suppose.*'
Enumerate these movements. Which of them would you describe to children ?

10. Draw a map of New Zealand, OR, Cape Colony.

11. (*Men only.*) What nationalities are largely mixed with the English in Cape Colony, Canada, Mauritius, Trinidad, New Zealand, Malta, and Barbadoes.
(*Women only.*) Describe Egypt, its boundaries, extent, population, physical features, climate and productions.

12. State the chief provisions of the Great Charter, which had a permanent interest affecting (*a*) feudalism, (*b*) taxation.

13. Give, with dates, the chief events of the Peninsula War, and describe in detail one of Wellington's battles.

14. (*Men only.*) Enumerate with dates the chief events in the struggle between Charles I. and the Parliament.

15. A block of stone weighing 15 tons is composed of 4 substances whose bulks are in the relation of 15 : 13 : 9 : 7 ; while the weights of a unit of their bulks are as 6 : 7 : 11 : 8. What is the weight of each substance in the block ?
Ans. tons 4-1-12 ; tons 4-1-1 ; tons 4-8-1-16 ; tons 2-10.

16. What sum of money put out at 3½ per cent. simple interest for 5½ years will amount to £476 10s. 0½d. Ans. £399 11s. 8d.

17. (*Men only.*) Find the area of a sector of a circle whose radius is 21 feet, the length of arc being 15 feet. Ans. 157½ feet.
(*Women only.*) Show as in making an apron, gathering, setting-in, hemming and sewing. Put on button, and make button-hole.

18 (*Men only.*) Two adjacent sides of a parallelogram are 1,200 and 860 yards, the perpendicular on the former from the opposite side is 120 yards Find the perpendicular on the latter from the opposite side. Ans. 60½ yards.
(*Women only.*) If an iron casting, which weighs 5 tons, 11 cwt., 9 lbs., cost £124 11s. 0½d, what will be the weight of a casting that costs £54 16s. 6½d ? Ans. tons 2-2-2-25.

19 (*Men only.*) Eliminate x and y from the equations $ay + bx = h$; $ky + hx = b^2$; $c^2 + y^2 = b^2$ Ans. $a^2 + b^2 = h^2 + k^2$.
(*Women only*) Give a list of the articles required (with approximate cost of each) to comfortably furnish a working man's cottage.

20. (*Men only.*) A certain fraction becomes ½ if 1 be added to its numerator. If 1 be added to its denominator it becomes ⅓. What is the fraction ? Ans. ⅖

CERTIFICATE ROUTINE FOR JUNE, 1892 (MEN AND WOMEN, FIRST YEAR).

DAYS	FIRST WEEK.			SECOND WEEK.			THIRD WEEK.			FOURTH WEEK.		
	I.	II.	III.	I.	II.	III.	I.	II.	III.	I.	II.	III.
MONDAY	Analysis of the Mental Powers	Read 'Lay of Last Minstrel,' Canto IV., *or* 'Ode on Immortality.'	Euclid, Book III., Props. 32 to 37, *or* Repairing Underclothing	The relative educational value of subjects ordinarily taught	Study Notes to 'Lay of Last Minstrel,' *or* 'Ode on Immortality.'	Euclid, Book III., Props. 1 to 8, *or* Cutting out of a Pair of Drawers	The influence of School Apparatus on the Intelligence	Analyse Lines 564 to 578 of Canto IV., 'Lay of Last Minstrel,' *or* Lines 129 to 145 of 'Ode on Immortality' Parse difficult words	Euclid, Book III., Props. 9 to 15, *or* Any Needlework	Moral Training	Read Bacon's Essays, XVIII., XIX., XXI., XXIV. *or* Study Grammar from Text-book	Euclid, Book I., Props. 40 to 48, *or* The Common Faults of Needlework
TUESDAY	Chief Dates from 1714 to 1748	Problems involving Quadratics, *or* Composition of Food	Physical Geography of Canada, *or* of Eastern Africa	Chief Dates from 1748 to 1763	Algebraic Factors *or* Clothing Outfits	Motions of the Earth	Poetry from 1603 to 1702 *or* Lives of Great Men from 1066 to 1153	Arithmetical Progression, *or* Stoves and Kitchen Ranges	Political Geography of Canada, *or* Geography of Central Africa	Chief Dates from 1763 to 1783	Harmonical Progression, *or* Composition and Functions of Air	The Flora and Fauna of Mountains
WEDNESDAY	Square Root	History from 1714 to 1748	Problems in Vulgar and Decimal Fractions	Stocks	Any Revision	Theory of Decimals	Any Revision, *or* 'Burke's Reflections'	Discount	Problems on Proportional Parts	Partnership	Any School Management	Geography of West Indies, *or* European Possessions in Africa
THURSDAY	History from 1649 to 1660, *or* History of 'The Standing Army.'	Problems involving Simultaneous Simple Equations *or* Nutritive Value of Food	Map of Wales, *or* Natal and the Transvaal	History from 1748 to 1763	Algebraic Factors *or* Manufacture of Clothing	The Atmosphere, Rain, Clouds, and Vapour	Constitutional Affairs from 1215 to 1461	Geometrical Progression, *or* Papering and Colouring Rooms	Map of New Zealand, *or* Political Africa	History from 1763 to 1783	Theory of the Simple Rules of Algebra, *or* The Respiratory Organs	Problems on Work and Pipes
FRIDAY	Notes of a Geographical Lesson to Standard IV., *or* on 'Colour.'	Deductions of Euclid, Book I., *or* Diagram of a Pair of Drawers	Analyse lines 422 to 433 of Canto IV., 'Lay of Last Minstrel,' *or* study Grammar from Text-book Parse difficult words	Cube Root *or* Stocks	Study the metrical structure of 'Lay of Last Minstrel,' *or* Wordsworth's Poems	How to teach Composition, *or* Answering in Infants' School	Training of the Memory	Deductions of Euclid, Book II., *or* Cutting out of a Woman's Chemise	Read Bacon's Essays, XIV., XV., XVI., XVII., *or* 'Burke's Reflections,' pp. 240 to 270	Notes of a Lesson on 'The Beaks of Birds'	Race Problems	Read Bacon's Essays, XXV., XXVII., XXVIII., XXIX., *or* 'Burke's Reflections' pp. 250 to 280

SATURDAY																
	Music, Accent, and Contents of Bars, *or* Continuations, Rests, etc.	Historical Dates	Grammar from Text-books	Deductions of Euclid, Book III., *or* Any Domestic Economy	Music, Transposition from one time to another	Lives of Great Men	Study of Prosody	Deductions of Euclid, Book III., *or* Any Arithmetic	Musical Terms	Euclid, Book I., Props. 27 to 39, *or* Proofs of Arithmetical Rules	Historical Dates	Composition on 'Presence of Mind'	Musical Rudiments	Lives of Great Men	Any Physical Geography	Composition on 'It is Never too Late to Mend.'

CERTIFICATE ROUTINE FOR **JUNE, 1892** (MEN AND WOMEN, SECOND YEAR).

DAYS	FIRST WEEK.			SECOND WEEK.			THIRD WEEK.			FOURTH WEEK.		
	I.	II.	III.	I.	II.	III.	I.	II.	III.	I.	II.	III.
MONDAY	Jevons' Logic, pp. 53 to 71.	Read 'King Lear,' Act III., Scenes 4 to 7, and Act IV., Scenes 1 and 2	Euclid, Book VI. first 8 Props. *or* Print and Linen Patches	The Playground	Euclid, Book VI., first 17 Props. *or* Any Sewing	Read Cantos I. and II. of 'Last Minstrel,' *or* Trench, Lecture VI.	Notes of a Composition Lesson to Standard IV.	Deductions on Euclid, Book VI. *or* Cut out on Paper a Boy's Shirt and Child's Pinafore	Paraphrase Lines 102 to 115 of 'King Lear,' Act III., Scene 6	Pages 84 to 93 of Spencer *or* Sections 189 to 195 of Locke	Euclid, Book VI., first 17 Props. *or* Any Needlework	Analyse Lines 32 to 41 of 'King Lear,' Act IV., Scene 1 Parse difficult words
TUESDAY	Chief Dates from 1640 to 1688 *or* History from 1789 to 1802	Cube Root *or* Square Root	As in First Year — Geography of Central America	History from 1660 to 1688 *or* From 1808 to 1815	Discount	As in First Year — Geography of Quebec and Ontario	Chief Dates from 1688 to 1727 *or* Poetry from 1789 to 1820	Mental Arithmetic	As in First Year — Geography of Manitoba and N.W. Territories	History from 1688 to 1702 *or* Scientific Advance from 1789 to 1820	Theory of G.C.M. and L.C.M.	As in First Year — Geography of Western United States
WEDNESDAY	Read 'King Lear,' Act IV., Scenes 3 to 7, and Act V., Scenes 1 and 2	Binomial Theorem *or* Household Expenses	The Code requirements of the Standards in the Three R's	Read 'Bacon's Essays' 30, 31, 32 *or* Notes on 'King Lear'	Pages 62 to 84 of Spencer *or* Sections 178 to 189 of Locke	Logarithms *or* Food for Dyspeptics	Mensuration *or* Any Revision	Jevons' Logic pp. 71 to 88	Interest and Annuities *or* Penny Dinners for School Children	Jevons' Logic, pp. 88 to 107	Interest and Annuities *or* Domestic Economy as a Class Subject	Any Geography
THURSDAY	History from 1066 to 1215 *or* History from 1802 to 1808	Stocks	As in First Year — Map of the Great Lakes of Canada	History from 1215 to 1377 *or* From 1815 to 1820	Square Root	As in First Year — Geography of Eastern United States	History from 1377 to 1455 *or* Political Writings from 1789 to 1820	Clock Sums	As in First Year — Map of British North America	History from 1455 to 1509 *or* Fiction from 1789 to 1802	Problems of Motion	As in First Year — Revise Geography of British North America
FRIDAY	Binomial Theorem *or* Food for the Sick	Deductions of Euclid, Book III. *or* Hedge-tears and Diagonal Darns	The Code requirements for the Class Subjects	Logarithms *or* Treatment of Skin Diseases	Revise Euclid, Book III. *or* Draw all the required Diagrams	Mensuration *or* Any Revision	Permutations and Combinations *or* School Penny Banks	Revise Euclid, Book I. *or* Describe the different methods of Darning	Read 'Bacon's Essays,' 36, 38, 39, 50 *or* Notes on 'King Lear'	Quadratics *or* Vaccination	Deductions on Euclid, Book VI. *or* Any Needlework	Paraphrasing (see Article)
SATURDAY	Music as in First Year	Algebraic Interest *or* Any Geography	Lives of Great Men	English Composition upon the character of Kent	Music as in First Year	Algebraic Interest *or* Any History	Historical Dates *or* Any Arithmetic	Repetition Literature and Penmanship	Music as in First Year	Any Euclid *or* School Management	L.C.M. and G.C.M. of Algebra *or* Any Geography	Paraphrasing (see Article)	Music as in First Year	Mensuration *or* Any Revision	The Progressions *or* Disinfectants	Repetition Literature and Penmanship

(*Women only.*) Explain what is meant by '*inspiration*' and '*expiration.*' Describe the uses of these operations and the organs concerned in performing them.

21. (*Men only.*) Write out Euclid II. 4.

If a straight line be trisected, then four times the square on the whole line is equal to nine times the square on the larger part.

(*Women only.*) When and how does air cease to be '*fresh*'? Explain clearly the effects of a poisoned atmosphere.

22. (*Men only.*) Place a rhombus in a triangle so that all the angular points of the rhombus fall upon the sides of the triangle.

FOURTH WEEK.

1. Write a large hand copy of '*Psychic Consciousness.*'

Write a small hand copy of '*Order is Heaven's first law.*'

2. Write from dictation :—'Once the mind is capable of receiving and acquiring, we have to determine the best form of intellectual food, and the quality and quantity of knowledge to be acquired. There is a vast difference between the ingestion and digestion of food, between cramming the memory and assimilation. The choice of intellectual food must be regulated by the nature of the individual brain. We have to introduce the maximum of elementary nutriment into the cerebral circulation with the minimum of waste.'

3. By what exercises may rapidity of computation in Arithmetic be most effectually promoted? How may accuracy of work be secured? What are the chief difficulties to be surmounted in giving a first lesson on decimals?

4. Describe the best method with which you are acquainted of teaching children to draw maps. How would you vary your directions in teaching them to draw maps of England, Russia, and Australia?

5. Rewrite the following, using tied notes to express the value of the dots, and dots to express the value of the tied notes :—

OR,

Name the kinds of measures formed by the following pulse signs :—

(*a*)

| : s | l .s : f .m | r :—.m | d ‖

(*b*)

| : s | — : | m :— .m | d : ‖

(*c*)

| m :—.d : f | m :—.s : l.s | f,m.r: d : ‖

6. Bar the following passages in accordance with the Time Signatures :—

OR,

Write in figures over the following, the value (as one pulse, ½ pulse, etc.) of each note and rest :—

| s :—.l :s.f | m :— :— | .s :l .,t : d' | s.f,m:r. : ‖

7. Point out some peculiarities of style in the language of Burke *or* Bacon, and illustrate your criticisms by not less than *six* passages quoted and commented upon.

8. Explain the following allusions :—(*Men only.*) '*A high speech of Seneca,*' '*An evil eye,*' '*The envious man that soweth tares,*' '*Saith Tacitus of Galba,*' '*primum mobile,*' '*The Legend, the Talmud, the Alcoran.*'

(*Women only.*) '*Old Jewry,*' '*Mess-Johns,*' '*Electoral College,*' '*A rubric,*' '*The fisherman,*' '*A kind of mortmain.*'

9. Give some explanation of the changes which take place when invisible vapour becomes visible, and when visible vapour becomes rain. Where are there rainless regions?

10. (*Men only.*) What is our chief trade with our West Indian Islands? How was trade affected by the emancipation of slaves? Write a short account of Jamaica.

(*Women only.*) Where and what are Khartoum, Gondar, Mapowah, Chad, Nyanza, Zanzibar, Zambesi, Suez, Kimberley, Fez, and Coomassie?

11. (*Men only.*) Give very brief descriptions of Hong Kong, Bombay, Aden, and Singapore. When were they acquired by the British Crown? Of what use is each of them to the Empire?

(*Women only.*) What do you know of Ashantee, Abyssinia and Zululand? What military operations have we undertaken in these countries?

12. Write a short account of the career of Robert Bruce, and state the grounds of his claim to the throne of Scotland.

13. Give some account of the state of affairs in Ireland in the years 1793, 1797.

14. (*Men only.*) Recite the chief declarations of the Bill of Rights as regards (*a*) The Dispensing Power, (*b*) Standing Armies, (*c*) Taxation, (*d*) Freedom of Parliament.

15. What will be the cost of the bricks for a wall 5 feet high, 22½ ins. thick, and 35 yards long, at 15s. per thousand, each brick being 9 ins. long, 4½ ins. wide, and 3 ins thick?

Ans. £10 10s.

16. If the weights of the same bulks of mercury and glycerine be as 11 to 1, what will be the height of a glycerine barometer when the mercurial barometer stands at 29·45 ins?

Ans. 9 yards.

17. (*Men only.*) Find the radii of a circle inscribed in a triangle whose sides are 45, 50, 60 feet. Ans. 15 feet.

(*Women only.*) Draw a diagram of an infant's shirt, showing the various parts of the garment. Give directions for making it up.

18. (*Men only.*) A circular grass plot contains 1,760 square yards. It is surrounded by a gravel walk 10 feet broad. Find the area of the walk. Ans. $160\sqrt{35}$.

(*Women only.*) Explain the use of the G.C.M. of two numbers or quantities. Reduce the fraction $\frac{12345}{45657}$ to its simplest form.

Ans. $\frac{23}{37}$.

19. (*Men only.*) Simplify $\dfrac{x^{\frac{1}{3}} + 3y^{\frac{1}{3}}}{x^{\frac{1}{3}} - 3y^{\frac{1}{3}}} + \dfrac{x^{\frac{2}{3}} - 3x^{\frac{1}{3}}y^{\frac{1}{3}} + 9y^{\frac{2}{3}}}{x^{\frac{2}{3}} + 3x^{\frac{1}{3}}y^{\frac{1}{3}} + 9y^{\frac{2}{3}}}$.

Ans. $\dfrac{2x + 36x^{\frac{1}{3}}y^{\frac{1}{3}}}{x - 27y}$.

(*Women only.*) Name some dishes specially suited to invalids. How should they be prepared?

20. (*Men only.*) An officer can form the men in his battalion into a solid square, and also into a hollow square 12 feet deep. If the front in the latter formation exceed the front in the former by 3, find the number of men in the battalion. Ans. 1,296.

(*Women only.*) Compare beef, mutton, veal, pork, and fish as articles of food in respect of nourishment and economy.

21. (*Men only.*) Find the centre of a given circle.

Construct a circle of given radius which shall pass through two given points.

(*Women only.*) What part of her own laundry work might a schoolmistress reasonably be expected to undertake? How and when should she do it?

22. (*Men only.*) Write out Euclid III. 17. What shorter method is there?

SECOND YEAR.

SECOND WEEK.

1. As in First Year.

2. As in First Year.

3. In what sense does Mr. Spencer use the word 'Science'? How does he justify his reply to the question '*What knowledge is of most worth?*' Say if in any respects that reply appears to you to be inadequate, or requires any addition, OR

Analyse the faculty of *Memory*, and say how, according to Locke, it should be trained.

4. Write out the notes of a lesson on *Gibraltar*, or (for Infants) on *Bread.*

5. As in First Year.

6. As in First Year.

7. Enumerate twelve instances where Shakespere's use of Prepositions differs from modern custom.

8. (*Men only.*) As in First Year. (Fourth Week.)

(*Women only.*) Mention some instances of the '*Reactive energy of words*' and the '*Influence of Words on Opinions.*'

9. (*Men only.*) As in First Year.

(*Women only.*) Draw a map of the most thickly populated portion of Canada.

10. (*Men only.*) As in First Year.

(*Women only.*) Name the principal mountain ranges of N. America, and the principal rivers that rise in their slopes. Show that the shortest route from England to New Zealand lies across N. America, and name the American ports of landing and embarkation.

11. (*Men only.*) As in First Year.

(*Women only.*) Describe the dangers that threatened England in the year 1796. With what nations was England at war between 1790 and 1800?

12. (*Men only.*) As in First Year.

(*Women only.*) Describe the lines of Torres Vedras, and the purposes for which they were formed by Wellington. Which of Napoleon's marshals were defeated by Wellington, and in what battles?

13. (*Men only.*) If $a + b$ vary as $a - b$, prove that $a^2 + b^2$ varies as ab.

If the time of describing any space vary as the square root of the space, and if the time of describing 144 feet be 3 seconds, what will be the time of describing 400 feet? Ans. 5 seconds.

(*Women only.*) Write short lives of John Wilkes and William Wilberforce.

14. (*Men only.*) If the number of Permutations that can be formed with a certain number of things taken 3 together is equal to 20 times the number, how many things are there? Ans. 6.

(*Women only.*) Cut out in paper the left half of a woman's night-dress.

15. (*Men only.*) Find the area of the curved surface of the frustum of a right circular cone, the circumferences of whose ends are 15 and 17 inches, and the slant height 11 inches. Ans. 176 sq. in.

(*Women only.*) As in First Year.

16. (*Men only.*) Find the area of the surface of a sphere whose radius is 5 inches. Ans. 314·16 sq. in.

(*Women only.*) As in First Year.

17. (*Men only.*) Inscribe a square in a given circle.

To inscribe in a circle a rectangle equal to a given rectangle.

(*Women only.*) Make a list of the utensils required for cottage cookery, and state the probable cost of each. What sort of stove or range would be suitable, and why?

18. (*Men only.*) As in First Year.

(*Women only.*) Give a few general rules for the management of a sick room.

FOURTH WEEK.

1. As in First Year.

2. As in First Year.

3. How is the general principle, that we should '*in teaching proceed from the simple to the complex*,' explained and illustrated by (*a*) Mr. Spencer, and (*b*) your own experience; *or*, How would you teach literary composition? What is Locke's advice?

4. Write out the notes of a lesson on '*The planetary system*,' *or* (for Infants) on '*The breakfast table*.'

5. As in First Year.

6. As in First Year.

7. Paraphrase Lines 30 to 42 of Scene 7, Act IV., of 'King Lear.'

8. (*Men only.*) Explain *almagest, bartizan, cairn, dight, eburnine, fleur-de-lys, gramercy, heriot.*

(*Women only.*) How does Shakespere use the words *validity, generation, subscribed, treachers, nuncle, admiration, temper, neat?*

9. (*Men only.*) As in First Year.

(*Women only.*) Compare the climates of the North American continent with those of similar European latitudes.

10. (*Men only.*) As in First Year.

(*Women only.*) Give some account of Mexico. Name its early Spanish conquerors, and describe the races which then inhabited it.

11. (*Men only.*) As in First Year.

(*Women only.*) Give some account of the Congress of Vienna. What policy did England pursue, and with what Powers was she chiefly in accord at that Congress?

12. (*Men only.*) As in First Year.

(*Women only.*) Detail the terms of the Union between Great Britain and Ireland. How is the government of Ireland now administered?

13. (*Men only.*) A boat club consists of 12 members. How many different crews of 8 can be formed, and from how many of these must an individual member be excluded? Ans. 495, 165.

(*Women only.*) Write short lives of Sir William Herschel and Charles Lamb.

14. (*Men only.*) Show that the number of combinations of n things taken p together + the number of combinations of n things taken $p - 1$ together = the number of combinations of $n + 1$ things taken p together.

(*Women only.*) Give the measurements, with diagram, of a shirt for a boy 10 years old.

15. (*Men only.*) A vessel holding 31,416 cubic inches, and *without* a lid, is in the form of a right circular cylinder, whose altitude equals the radius of the base. Find in square inches the area of the internal surface. Ans. 4.375.

(*Women only.*) As in First Year.

16. (*Men only.*) The area of the whole surface of a right circular cone is 100 square feet. Find in cubic feet the volume, when the slant height is twice the radius of the base. Ans. 62·688.

(*Women only.*) As in First Year.

17. (*Men only.*) If two of the sides of a triangle, or those sides produced be cut proportionally, the straight line which joins the point of section shall be parallel to the remaining side of the triangles.

ABC and DBC are two triangles, AD being parallel to BC. Prove that the parts of any line parallel to BC, which are intercepted by the triangles, are equal.

(*Women only.*) Describe the different methods of cooking meat, and specify the advantages and disadvantages of each method.

18. (*Men only.*) As in First Year.

(*Women only.*) What immediate steps should be taken in case of croup, nose-bleeding, dog-bite, poisoning, scalds and burns, cuts and wounds, fainting, broken bone?

The names of any Certificate Candidates, not being students in any Training College, must be notified to the Education Department not later than the 1st of October.

Every Acting Teacher should see that his name is inserted in the Annual Return (Form IX.) Table XVII., followed by the words 'Christmas Examination, First or Second Year Papers' as the case may be.

All Students should procure Brook's Geography. There is none published so completely on the lines of the Scholarship and Certificate Examinations, or with the facts and figures more up to date.

CORRESPONDENCE.

We shall be pleased to reply briefly and through these columns to anyone seeking examinational information and advice.

This privilege does not, of course, extend to furnishing the solutions and answers of problems. All such communications should be addressed to 'THE QUERY EDITOR.'

Replies demanding urgency will be promptly forwarded per post on receipt of a stamped and addressed envelope. A post will be saved by writing direct to DR. GEORGE BEACH, M.A. *(Examination Editor of Practical Teacher)*, STANLEY MOUNT, MACCLESFIELD.

S. M. (New Galloway).—Yes. The second year. Apply to some provincial college.

A. Y. (Mostyn).—We have not heard the other side, but doubtless he will withdraw. Are you a member of the N.U.T.?

'FRATER' (Bishop Stortford).—The posts are not worth having, although candidates are multitudinous.

B. L. (Naas).—You can join the Association mentioned. Write to the secretary.

'PETER' (Liskeard).—'White cartridge paper cut in sheets of about the size of Imperial octavo, or about 11 in. by 7¼ in.'

A. M. N. (Ludlow).—The composition is judged upon all the exercises which admit of literary style.

C. Z. (Tetbury).—Our September number is out of print. Try John Heywood's (Manchester) Scholarship Answers.

FOURTH YEAR P. T. (Sunderland), M. S. (Earlston).—Both the exercises will count.

'TEN' (Buxton).—You must get a certificate from an organist.

'ILM' (Oundle).—The remarks are a libel on the profession. See 'Notes and Notions.'

F. W. (Ramsey).—In England the surplus goes to reduce the ten-shilling grant. You do things better in Manxland.

E. U. (Kingston, Victoria).—You would have to pass the ordinary examinations. The profession is crowded, and we want some of our *confrères* to emigrate.

'BAT' (Market Rasen).—See Article 67 of Code.

'JACOBUS' (Luton)—You will get credit for any May successes. A form will be supplied at the Scholarship, whereon you will enter your candidatures.

J. B. (————).—See June Certificate article.

D. T. (Ayr).—You must pass the examination in Geometrical Drawing, Section 1, of Science Subject I.

Y. M. (Gloucester).—If you mean to continue in the profession you *must* extend your indentures.

B. H. (Runcorn).—We cannot tell; the author is not famous enough.

'PAR EXCELLENCE,' 'EN AVANT,' and 'PATTIE' (Stevenage).—We congratulate you most heartily, thank you for your kind appreciation, and wish you all success in Second Year Papers.

P. H. R. (Market Harborough).—Kindly send on further particulars, and we will reply per letter.

'C. S.' (Yedburgh).—Next month.

A. B. (Burton-on-Trent).—(1) 85 per cent. (2) We shall attempt to finish it, but cannot positively guarantee; our space is so limited.

T. J. (Tonypandy).—You are not a bad writer, but should attend a little more to the proportions of the letters. Get a sample box or card of varieties of pens from any good scholastic stationer. In your case use different pens for large and small hand.

W. E. (Drogheda).—Scott's novels can be obtained at any price from 6d. upwards.

K. O. (York).—Either.

V. V. (Nottingham).—Apply through your Correspondent to Education Department.

G. V. (Rotherham).—You are not qualified as an Assistant.

'SMITH-JONES' (Lichfield).—You can claim your salary for the week during which you were ill. Forward a medical certificate with your demand.

PRISTINE (Birmingham).—New clergyman, new schoolmaster. This is quite an ordinary and abominable occurrence. Join N.U.T.

J. M. (Newcastle-on-Tyne).—The course cannot now be shortened. He should have passed end of First Year instead of Candidate.

L. A. (Dover), S. S. (Chelmsford).—A specimen example appears this month.

'ZOUNDS' (Pembroke Dock).—Wollman's 'Teachers' Arithmetic,' published by Joseph Hughes and Co.

C. G. (Wellsbridge).—Not now published by Department.

O. C. (Perth).—The Scotch differs from the English syllabus.

S. J. (Edgbaston).—The question is a highly improper one.

'NEVER' (Burslem).—Scott, Lytton, Ainsworth, Kingsley, and Smollett.

G. W. (Chesterfield).—We don't know any portrait painters.

L. D. (Grantham).—Questions may be set on 'How to teach the Metric System.'

U. E. (Builth).—See answer (2) to 'A. B.'

'A. B. S.' (Bilston).—Model Drawing, Second Grade, will count at Scholarship.

CONSTANT SUBSCRIBER (New Cut, London).—The assertion is now incorrect. Follow the directions on the paper itself.

S. W. (Workington).—Adjectives qualify attributively, predicatively, and factitively.

R. J. (Fenton).—Arrange with H.M.I.

J. G. (Bangor).—You need take one part only.

P. L. (Jarrow).—It is scarcely possible to get a First Class without some *extras*.

S. T. (Chelsea).—You will see that we have met your wishes.

P. J. (Bangor).—You must get permission from Department.

A. W. (Cockermouth).—You cannot take elementary and advanced in the same year, even if the examinations are at different times.

B. C. (Stockport).—The charge for books will still be allowed in addition to the fee.

IGNORAMA (Shrewsbury).—The deductions cannot be omitted altogether, without great risk of failing at the 'Locals.'

F. N. T. (Lerwick).—He must give the usual notice.

J. E. J. (Flint).—The difficult questions score higher marks.

Z. (Newton Heath).—No sewing need be shown.

S. S. (Burslem).—There is no necessity for a personal interview.

J. P. (Llangollen).—You must take Arithmetic not Mensuration.

'SO' (Smethwick).—The indentures must be extended.

B. C (Thetford).—You cannot take Science at Christmas.

LETTERS ANSWERED BY ORDINARY POST.

R. T. B. (Chorlton-on-M.), E. T. (Marple Bridge), J. M. J. (Cheadle), A. M. N. (Dumfries), A. E. P. (Barking), P. T. (South Shields), R. N. (Marsh Terr), A. S. H. (Ilford), J. W. (Whaley Bridge), L. R. (Mount Hawke), STUART (Colchester), F. W. F. (Ladywood), L. T. (Thirsk), H. B. (Haslingden), PATIENCE (Walsall), E. S. (Liverpool), K. J. B. (Malmesbury), R. H. V. (Callington), K. O. (Mansfield), J. S. (Pontypridd), A. J. K. (Grays), G. W. P. (Tonbridge), J. D. (Southport), W. J. W. (Luton), L. H. (Burnley), J. C. (Braintree), C. W. J. (Rhyl), J. W. (Penygraig), F. W. D. (Beccles), G. C. (Kingsbridge), K. J. B. (Malmesbury), W. C. (Wick), W. R. (Tunstall), J. N. (Birmingham), T. M. (Worsley), G. E. H. (Plasmarl), T. H. (Drefach), S. C. (Modbury), F. J. W. (Tredegar), J. E. R. (Rushton), S. T. P. (Holborn), H. E. N. (New Ferry), J. G. R. (Cramlington), M. S. S. (Swindon), T. S. (Culham), VIZ. (Swansea), J. P. (Cardiff), J. E. L. (Frizington), C. B. (Crewe), A. E. P. (Peterborough), N. F. (Breakish, Skye), G. E. G. (Connah's Quay), E. T. (Clayton), H. O. and S. O. (Congleton), P. J. (Coedpoeth), TUNE (Wolverhampton), S. M. (Weston), E. C. B. (Stevenage).

LONDON MATRICULATION.

JUNE, 1892.

OUR PREPARATION CLASS FOR PRIVATE STUDENTS.

BY T. RUSSELL MALTBY, M.A.

Kingswood School, Bath.

(SIXTH MONTH.)

We have incorporated in these notes for the month a selection of

MODEL ANSWERS

to questions set at the Matriculation Examination last January. The great pressure on our space has made this reduction necessary; but the selection has been carefully made, and we believe that our readers may gain much from the careful consideration of these more instructive examples. This month we complete another half-yearly course. It will have been most helpful to candidates who had their work well in hand six months ago. As a rule, a full year's preparation is required for the London Matriculation; and we hope to have in our Preparation Class next month a large number of students who have been reading for half a year or longer with a view to matriculation in January, 1893.

Those of our readers who shall this month make the great venture have our best wishes. If they have done all that they have been told to do in these columns, no Examiner will be able to say them nay.

I. LATIN.

Notes on May Work.

Allen's Grammar, Sects. 164-175, 180-183, 196-208.

(1) Numerals. Beside the multiplicatives in *-plex*, there are others in *-plus*, generally used in the neuter only: *dupla et tripla intervalla, intervals twice and thrice as large; tempus sescuplum, a period half as long again.*

(2) Sect. 165 (*c*). Two other uses of distributive numerals are—(*a*) in expressions of multiplication (*bis bina, twice two*), (*b*) instead of cardinal numbers (in poetry).

(3) Note again *binae litterae, two epistles, trina spolia, three sets of spoils*, etc.; but *unae litterae, one epistle, unae aedes, one set of rooms.* See *Allcroft and Haydon*, Sect. 187.

(4) *Alternis diebus*, every second day; *uni et alteri*, the ones and the others, one party and the other.

(5) Sects. 166, 167. Pronouns. These are important. Revise the declension of the simple relative, interrogative, and indefinite pronouns, distinguishing substantival and adjectival forms. *Qui* is used as ablative in all genders and numbers, but especially as an adverb. *Quicum* is very common.

(6) For the meaning and use of the pronouns revise *Allcroft and Haydon*, Sects. 166-176. See also *Allen*, Sect. 314 ('some' and 'any'). *Quisque, quisquam*, and *ullus* are particularly important.

(7) *Quivis* and *quilebet* (any you please) may be used in both positive and negative sentences, since they imply that *all* will answer the required conditions. *Quisquam* and *ullus* imply that *none—or at least very few*—will answer the required conditions.

(8) Remember to use *quis* for *aliquis* after *si, nisi*, and *ne*, and to translate 'and no one' by *nec quisquam* or *nec ullus* (or, in final clauses, *neu quis*).

(9) Elsewhere Allen gives the following rule for *ecquis* and *numquis:* they are to be used in all Direct Questions which contain the word *any*, and in all Oblique Questions where *whether* is followed by *any*.

(10) For reciprocals (*one another, each other*) use *inter se* (indeclinable) or *alter . . . alterum.*

(11) *Alternis diebus*, every second day.
Uni et alteri, the one party and the other.
Alius aliud petit, one man seeks one thing, another another.

(12) Someone may say, *dixerit quis.*
Should one say, *dicat quis.*
One would have thought, *cogitares.*
One often says, *solet dici.*
One may not, *non licet.*
One hopes so, *ea speramus.*

(13) Learn the following correlatives (Cf. *Allcroft and Haydon*, 165). For meanings, see Dictionary.

Demonstrative	Relative	Interrogative	Indefinite Relative	Indefinite
is	*qui*	*quis?*	*quisquis*	*aliquis*
tantus	*quantus*	*quantus?*	*quantuscumque*	*aliquantus*
talis	*qualis*	*qualis?*	*qualiscumque*	—
ibi	*ubi*	*ubi?*	*ubiubi*	*alicubi*
eō	*quo*	*quo?*	*quoquo*	*aliquo*
eā	*qua*	*qua?*	*quaqua*	*aliqua*
inde	*unde*	*unde?*	*undecumque*	*alicunde*
tum	*cum (quum)*	*quando?*	*cumcumque*	*aliquando*
tot	*quot*	*quot?*	*quotquot*	*aliquot*
toties	*quoties*	*quoties?*	*quotiescumque*	*aliquoties*

(14) Sect. 168. Form abstract nouns from the following :—*bonus, civis, cupio, dulcis, lumbus, pauper, prudens, rubus, segnis, senex, superbus, solus.*

(15) Sect. 169. Form adjectives from the following :—*alo, audeo, auris, bibo, capio, civis, collis, cupio, dies, diu, divus, domus, egeo, eximo, favor, femina, finis, funus, forum, frango, heri, hodie, hostis, infimus, lac, later, libertus, merus, mons, natura, noceo, nosco, ordo, palus, pater, patruus, pedes, plebs, protero, recido, rosa, salix, serus, silva, terra, ver; versus* (a turning), *vetus, vitulus.*

Latin Course for June.

1. *Allen's Grammar.* See that the following parts are well known :—Notes on declensions, adjectives of second class, quasi-numeral adjectives, rules for comparison, note on verbs in *-io*, verb infinite of *utor, page 66*, anomalous verbs, principal parts (if marked), genitives (Sect. 158), Sects. 300, 309, 314.

2. *Allcroft and Haydon.*—Revise among sects. 34, 35, 37-40, 42, 50, 51-53, 68-75, 92-94, 109, 112-128, 153, 155, 199, 200, 202, 219, 227, 228, 232-247, 248, 281, 284-286, 290-294, 304-312.

3. *Allcroft and Haydon's Exercises.* One or two sentences a day. C.'s only.

4. *Vergil, Aeneid, VI. and VII.* Revise your summary of the subject-matter, and go over the most difficult marked passages.

5. Observe the 'Model Answers' published in the PRACTICAL TEACHER last month.

II. GREEK.

Course for June.

1. *Abbott and Mansfield, Sects. 102-168* (Revision). Observe the sections on Augment and Reduplication. Omit 129-146. Make sure of the verbs in *μι*, and revise only commoner words in 164-167. Go over the lists of Regular Verbs, pp. 149-151.

2. *Abbott and Mansfield, Sects. 157-163, 167, 168, 170, 178-182.*

3 *Xenophon, Anabasis IV.* Revise the history, geography, and subject-matter. Prepare a simplified map. Look up the translation of marked passages and the parsing of special forms.

5. Observe the 'Model Answers' in Greek published last month.

FRENCH.

Course for June.

1. *Breymann. Revision*, especially *Pronouns.*

2. *Translation.* Go over some of your best work in Fasnacht.

3. Make sure of your *Word Lists* and *Phrase Lists.* The former should now contain some hundreds of words.

Notes on the January Questions.

For translation two extracts were to be chosen out of three. A was undoubtedly the most difficult—a passage taken from the same author, G. Valbert, as the passage of June, 1891. It contains the following words :—

vente (f.), sale	*armoire* (f.), press
huissier, bailiff	*solive*, (f.) joist
agioteur, stock-jobber	*carafe* (f.), decanter.

Note also the phrases *tranches de lard* (*de bœuf*, &c.), *tout leur monde, pain bis.* C contains some common tense-idioms and the following words —*disponible*, at his disposal, *blocus*, blockade.

In the Grammatical Questions there was a choice of seven out of ten. The fifth and the tenth would be shunned by most as requiring the translation of English phrases into French. Candidates should read through *all* the extracts in the first part of the paper, because grammatical questions in Part II. are founded on the three indiscriminately.

III. ENGLISH.

Course for June.

1. *Mason, pp. 160-171* (Classification of Sentences), *and 171-182* (Summary of the Rules of Syntax). These sections form the best preparation for the usual question 'Correct or justify . . . . ' Observe those on *adverbial clauses relating to degree and condition, repetition of definite adjectives, syntax of pronouns, uses of subjunctive*, and especially *the uses of the infinitive.*

2. *Mason, pp. 186-206* (Examples of the Analysis of Sentences). It is not necessary to spend much time here. Rewrite a few examples after your usual method of arrangement.

3. *Punctuation.* (*Mason, p. 206* or *Hewitt and Beach, p. 439*), and *Figures of Speech* (*Hewitt and Beach p. 446*).

4. *Different elements of the English vocabulary, Hewitt and Beach, pp. 465-469.* Learn the *classes* of words, not the lists.

5. *Grimm's Law, Mason, pp. 219-221.* This is an important piece of work. For Dr. Morris's Mnemonics, see *Hewitt and Beach, p. 651.*

6. *English History, 1685-1702*, and final revision.

Notes on the English Papers.

In the *English Language* paper not more than ten questions were to be attempted out of fifteen. 11. (*b*) asked for explanations of the forms *betimes, whilom, erewhile, piecemeal, ashore ;* 12. (*b*) for various senses in which *by, to, with* are used. The two following were somewhat new :—13. Distinguish between the words *stationary* and *stationery, perception* and *conception, idiotic* and *idiomatic, idol* and *idyll, politic* and *political.* 14. What do you understand by these words : *episode, epoch, era, chronology, evolution, epic, prosody, prerogative, eliminate, university?* 15. is answered below.

In *English History* not more than ten questions were to be attempted out of seventeen. Stress was again laid on the earlier periods. Three maps were asked for—of Roman Britain, of England (to show the localities of the battles in the Wars of the Roses), and of the world (to show English possessions in 1700). No. 15 was unusual—productions, manufactures, and foreign trade under the Tudors and Stuarts.

Model Answer.

English Language. 15. Write down any stanza of English Poetry ; describe the metre in which it is written, and also analyse it.

In Misery's darkest cavern known,
His useful care was ever nigh ;
Where hopeless Anguish pour'd his groan,
And lonely Want retired to die.

The above is a stanza of four lines, of which the first rhymes with the third, and the second with the fourth.

Each line consists of four feet—

In *Mis-ry's dar-kest ca-vern known ;* each foot consisting of an unaccented followed by an accented syllable—

His use-ful care was e-ver nigh.

Hence the metre is described as an *iambic tetrameter.*

A. The four lines constitute a *Principal Complex Sentence.*

1. In Misery's darkes cavern known ...	*attributive adjunct of 3.*
2. His, useful	*attributive adjts. of 3.*
3. care	*subject.*
4. was	*predicate incomplete.*
5. ever	*adverbial adjt. of pred. (time).*
6. nigh	*complement of 4 (subjective).*
7. where hopeless Anguish poured his groan	*adverbial adjt. of pred. (place). See B.*
8. (where) lonely Want retired to die ...	*adverbial adjt. of pred. (place). See C.*

B. Where hopeless Anguish poured his groan ... ... *subordinate adverbial clause co-ordinate with C.*

1. Where	*adverbial adjt. of 4.*
2. hopeless	*attributive adjt. of 3.*
3. Anguish	*subject.*
4. poured	*predicate.*
5. his groan	*object (direct).*

C. [and] (where) lonely Want retired to die *subordinate adverbial clause co-ordinate with B.*

1. where	*adverb adjt. of 4.*
2. lonely	*attributive adjt. of 3.*
3. Want	*subject.*
4. retired	*predicate.*
5. to die	*adv. adjt. of 4 (purpose).*

IV. MATHEMATICS.

Course for June.

1. *Arithmetic. Bookwork of Recurring Decimals.*
2. *Hall and Stevens's Euclid, Book IV. to p. 276.*
3. Revise Book I. rapidly and Book II. thoroughly, especially Propositions 4, 5, 9, 10, 11, 12, 13, 14.

Model Answers.

Arithmetic and Algebra, 6.—If $x + y = a$, $x - y = b$, find the value of $x^4 - y^4$.

$x + y = a$

$x - y = b$

$\therefore 2x = a + b$ and $x^2 = \frac{a^2 + b^2 + 2ab}{4}$

$2y = a - b$ and $y^2 = \frac{a^2 + b^2 - 2ab}{4}$

$\therefore (x + y)(x - y)(x^2 + y^2) = ab \times \frac{a^2 + b^2}{2}$

or $x^4 - y^4 = \frac{ab}{2}(a^2 + b^2)$.

Arithmetic and Algebra, 7.—Prove that $x^3 + y^3 + z^3 - 3xyz$ is divisible by $x + y + z$; and find the other factor. Hence, or otherwise, prove that

$(x + y)^3 + (y + z)^3 + (z + x)^3 - 3(x + y)(y + z)(z + x)$ and $(x + y - z)^3 + (y + z - x)^3 + (z + x - y)^3 + 3(x + y - z)(y + z - x)(z + x - y)$ are numerical multiples of the first expression.

Put $x + y + z = 0$; then $x = -(y + z)$ and $x^3 + y^3 + z^3 - 3xyz$

$= -(y + z)^3 + y^3 + z^3 + 3(y + z)yz$

$= -y^3 - z^3 - 3y^2z - 3yz^2 + y^3 + z^3 + 3y^2z + 3yz^2 = 0$.

$\therefore$ Since $x^3 + y^3 + z^3 - 3xyz$ vanishes when $x + y + z = 0$, it is divisible by $x + y + z$, and by division the other factor is found to be

$x^2 + y^2 + z^2 - xy - yz - zx$.

Now in the general formula

$X^3 + Y^3 + Z^3 - 3XYZ = (X + Y + Z)(X^2 + Y^2 + Z^2 - XY - YZ - ZX)$ for X put $(x + y)$, for Y put $(y + z)$, for Z put $(z + x)$; therefore $(x + y)^3 + (y + z)^3 + (z + x)^3 - 3(x + y)(y + z)(z + x)$

$= \{(x + y) + (y + z) + (z + x)\}$

$\times \{(x + y)^2 + (y + z)^2 + (z + x)^2 - (x + y)(y + z) - (y + z)(z + x) - (z + x)(x + y)\}$

$= 2(x + y + z) \times (x^2 + y^2 + z^2 - xy - yz - zx)$

$= 2(x^3 + y^3 + z^3 - 3xyz)$

Again in the general formula

For X put $(x + y - z)$, for Y put $(y + z - x)$, for Z put $(z + x - y)$ and alter the misprint + 3 to − 3; therefore $(x + y - z)^3 + (y + z - x)^3 + (z + x - y)^3 - 3(x + y - z)(y + z - x)(z + x - y)$

$= \{(x + y - z) + (y + z - x) + (z + x - y)\}$

$+ \{(x + y - z)^2 + (y + z - x)^2 + (z + x - y)^2 - (x + y - z)(y + z - x) - (y + z - x)(z + x - y) - (z + x - y)(x + y - z)\}$

$= (x + y + z) \times (4x^2 + 4y^2 + 4z^2 - 4xy - 4yz - 4zx)$

$= 4(x + y + z)(x^2 + y^2 + z^2 - xy - yz - zx)$

$= 4(x^3 + y^3 + z^3 - 3xyz)$.

Hence the given expressions are respectively twice, and four times, the first expression.

Geometry.—1. The ten questions included five propositions of Euclid, namely, I. 24, II. 7, II. 11, III. 15, III. 22. II. 7 was disguised thus:—

Prove geometrically that the squares on any two lines exceed twice the rectangle contained by the lines, by the square on the difference of the lines.

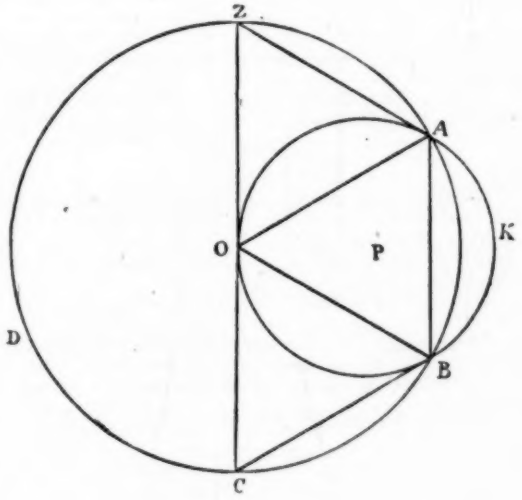
The tenth question: Prove that if the circumference of a circle be divided into any number of equal arcs, the polygon formed by the chords of these arcs has all its sides equal and all its angles equal.

Also, prove that the circle through the centre and the extremities of any side touches the adjacent sides; and that the radii of the first circle, drawn to the vertices, cut the second circle in points which form the vertices of another regular polygon.

(*a*) Let the circumference of the circle ABDZ, whose centre is O, be divided into the equal arcs AB, BC, CD, ... ZA.

It is required to prove that the chords AB, BC, ... ZA are equal, and that the angles ZAB, ABC, BCD, ... are equal.

Join ZA, AB, BC.



Because the arcs AB, BC, ... ZA are equal,
$\therefore$ The chords AB, BC, ... ZA are equal (Euc. III. 29).
Again, the whole arc ZB is equal to the whole arc AC; from the whole circumference take these equals,

∴ the remaining arc ZDB is equal to the remaining arc ADC,

∴ the angles at the circumference, ZAB and ABC, which stand on these arcs are equal (Euc. III. 27).

In the same way it may be proved that all the angles of the polygon ABCD . . . . Z are equal.

(*b*) Let the circle AOBK pass through the centre O and the extremities of the chord AB.

Join OZ, OA, OB.

Then in the Δs. OZA, OBA, we have

ZA = AB, AO = BO, OZ = OA.

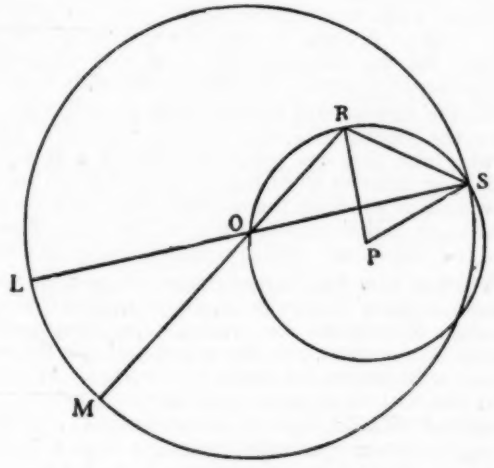
∴ ∧ ZAO = ∧ ABO (Euc. I. 8.)

But the straight line at A, which makes with the chord AO an angle equal to the angle in the segment ABO is the tangent to the circle at A (Euc. III. 32).

∴ AZ touches the circle AOBK.

Similarly might be shown that the circle OAKB touches the other adjacent side, BC.

(*c*) Let the given polygon contain *n* sides; let L, M be any two adjacent vertices, and let the radii LO, MO when produced cut the second circle in the points R, S. Join RP, RS, SP.



Then because the polygon contains *n* sides, AB, CD . . . LM.

And the arcs AB, CD . . . LM are equal.

∴ Each of the angles, at the centre, which stand on these arcs, is equal to the *n*th part of 4 rt. ∧s. (Euc. III. 27).

∴ ∧ LOM = *n*th part of 4 rt. ∧s.

∴ ∧ ROS = *n*th part of 4 rt. ∧s. (Euc. I. 15).

∴ ∧ RPS = twice the *n*th part of 4 rt. ∧s. (Euc. III. 20).

Similarly it may be proved that the chord between any two of the vertices on the second circle subtends an angle at the centre equal to twice the *n*th part of 4 rt. ∧s.

∴ the arcs of the second circle are equal (Euc. III. 26).

∴ the chords of the second circle are equal (Euc. III. 29).

∴ it may be shown, as above, that the angles of the polygon in the second circle are equal.

∴ the points where the radii of the first circle cut the second circle form the vertices of a regular polygon.

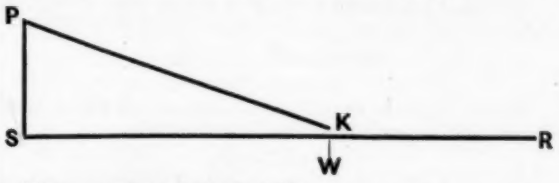
V. MECHANICS.

Course for June.

Hamblin-Smith's Hydrostatics, Chapters III., IV., V. (Specific Gravity, Equilibrium of Bodies under the action of Fluids, Properties of Air). The January paper in Mechanics was prefaced by the injunction: *Answer clearly and neatly. Slovenly work will not gain much credit.* There were eight questions.

Model Answers.

Question 2.—A weight of 20 lbs., suspended by a string from a peg P, is pulled aside by another string knotted to the first at a point K, and pulled horizontally. Find the force necessary to pull it until PK is 60° from the vertical; and find, at the same time, the force on the peg.



There are three forces in action:—

(1) the weight acting perpendicularly downwards, in the direction KW,

(2) the horizontal force, acting in the direction KR,

(3) the tension of the string, acting in the direction KP.

From P draw a perpendicular PS, meeting RK produced.

Then the Δ PKS will represent the three forces in equilibrium, for

KP is the direction of the tension.

PS is in the same direction as KW.

SK is in the same condition as KP.

Putting the angle at P, equal to 60°, we have KP = 2PS and SK = $\sqrt{KP^2 - PS^2}$.

But the weight is 20lbs.

∴ The horizontal force required is $20\sqrt{3}$ lbs., and the force on the peg, which is equal to the tension of the string, is 40 lbs.

Question 6.—A spherical leaden bullet is cast with a hollow in its interior; how could you ascertain the size and position of the hollow without spoiling the bullet?

(*a*) Weigh the bullet; let its weight be w_1 grammes.

(*b*) Weigh the bullet in water; let its weight be w_2 grammes

(*c*) $w_1 - w_2$ = weight of water displaced.

(*d*) Divide w_1 by the spec. gr. of lead. This is the weight of a volume of water equal to the lead of the bullet. Call this w_3.

(*e*) $(w_1 - w_2) - w_3$ = weight of the water which would fill the hollow.

∴ The size of the hollow is $w_1 - w_2 - w_3$ cubic centimetres.

To find the position of the hollow without spoiling the bullet, float it in mercury. If it will float in any position the hollow is at the centre. If not, the hollow is nearer that side of the bullet which floats uppermost, and lies on the diameter from the point which is highest as the bullet floats.

VI. CHEMISTRY.

Course for June.

Kemshead, Chapters XIX., XX., XXI., XXII. (Compounds of Carbon with Hydrogen, Bromine, Iodine, Fluorine, Phosphorus, Silicon). The last paper contained six questions. The first, on *coke*, is answered below. The third asked for a comparison of the properties and compounds of the elements chlorine, bromine, iodine. See pp. 237-239 of this month's work.

Model Answer.

Question 1.—What is coke, and how is it made? Explain the difference noticeable in the burning of coke and the burning of coal. Why does coke leave more ashes than the coal from which it is made?

Coke is an amorphous form of carbon, containing fewer impurities than coal. It bears the same relation to coal, as charcoal to wood. It is made by charring certain sorts of coal in closed retorts, into which no air is admitted, and from which the volatile products escape freely.

Burning coke gives out *more heat* than burning coal, because, with the purer form of carbon, combustion is more rapid and complete. Owing to this rapid combustion of coke,

the carbon dioxide which is formed when air enters a coke fire is converted to carbon monoxide, unless there is a special supply of oxygen. The further combustion of this carbon monoxide accounts for the *blue flame* at the top of a coke fire. Burning coke gives off *little or no smoke*, because the volatile products of which coal-smoke consists are driven off in the manufacture of coke. Hence it is that coke leaves more ashes than the coal from which it is made, since, weight for weight, coke contains a greater proportion of solid residue.

HEAT AND LIGHT.

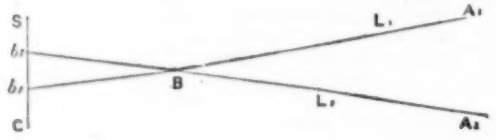
Course for June.

Wallace Stewart's Light, Chapters IX. and X. (Velocity of Light, Optical Instruments and Experiments).

Model Answer.

Question 4.—Describe how to compare the intensities of two lights by a shadow photometer. A bar, 18 centimetres from a screen, casts two shadows close together, of equal shades, when the two lights are respectively 20 centimetres and 30 centimetres distant *from the bar*; calculate the ratio of the intensities of the two lights.

The following is a plan of Rumford's Photometer :—



SC is the foot of a movable upright screen of ground glass. B is an upright bar. BA_1, BA_2 are slight diverging graduated lines, along which the two lights L_1, L_2 are moved, until the shadows b_1, b_2 cast by B appear to be equally dark. In order to compare them more easily, SC is moved until b_1, b_2 are close together on the screen.

Then since equality in the intensity of the shadows means equality in the intensity of the lights, we have, by the law of inverse squares,

Intensity of L_1 : intensity of L_2
= sq. of distance L_1 b_1 : sq. of distance L_2 b_2.

In the example given, L_1 b_1 is 30 + 18 centimetres and L_2 b_2 is 20 + 18 centimetres,

∴ the ratio of the itensity of the light 30 centimetres from the bar, to that of the other light, is 48^2 : 38^2

= 2304 : 1444
= 576 : 361

RECREATIVE BOTANICAL PAPERS.

BY PROFESSOR J. R. GREEN, M.A.
Examiner to the University of Cambridge.

III. Merry May.

With the advent of the merry month of May the young collector should be busy in field and garden, getting together specimens for the herbarium, whose construction we talked about in our last recreative botany paper (P.T. vol. 12., p. 138). This month we must try to study the second great sub-class into which we learned to divide the Dicotyledons, or plants with two seed leaves. Its name is Calycifloræ, and it differs in one or two important particulars from the Thalamifloræ, which we examined last time. Before, however, we turn to the plants which are classed together into this division, we will add a few specimens to our Thalamifloral plants, which are now in flower, but which had passed that stage last year. We shall, of course, remember that all the members of Thalamifloræ agree in having their petals free and their stamens hypogynous, *i.e.*, springing from the *thalamus*, close to the top of the flower stalk, and inside the brightly coloured petals.

Taking first the *Ranunculaceæ*, or crowfoot tribe, we shall be able to find several plants with free petals, indefinite free hypogynous stamens, and carpels wholly distinct from each other. In the hedges, where the soil is of a chalky character, grows the pretty plant called the 'Travellers' Joy,' which received its name from 'decking and adorning ways and hedges where people travel.' This is our only wild clematis; it has no corolla, but its greenish-white sepals, 4-6 in number, resemble petals, and its carpels have long feathery tails, which give it the familiar name of 'Old Man's Beard.' Then in the woods we may find the beautiful white wood-anemone, or windflower, whose coloured relations, the blue, scarlet, and pink anemones, make our garden beds so gay; also the yellow blossoms of the wood crowfoot. On every bank are to be seen the glossy starlike golden flowers and kidney-shaped leaves of the lesser celandine, one of the brightest of spring flowers; while from the meadows you can pick the buttercup in dry places, and from the margin of the stream the gay marsh-marigold or king-cup, whose yellow sepals resemble the petals of the other flowers.

To the very marked natural order we called *Cruciferæ*, the crucifer tribe, which comprises plants whose flowers have four free petals arranged in a cross, and four long and two short hypogynous stamens, we are now able to add from the meadows the pretty cuckoo-flower, or ladies' smock, with its little lilac flowers, and the wall-flower from dry old walls or garden beds.

We can now find representatives of another small natural order of Thalamifloræ, which is called *Violaceæ*, because it contains the violet. The sweet-scented violet is now over, but the dog-violet and the wild pansy or heartsease can easily be obtained. We shall find that both these plants agree in having calyx leaves furnished with peculiar ear-like appendages; petals of irregular shape, one being prolonged into a spur or tube containing honey, five crested anthers, and a very curious hooded stigma. There is a single ovary or seed-box, which has three rows of ovules attached to its sides.

Now for this month's special work. It is still too early to get together representatives of all the natural orders of Calycifloræ, but we can secure some of each of the more prominent ones. In the course of our expeditions into the country we will gather some of the furze, which is making our commons blaze with colour, taking care, however, to avoid the prickles which make this plant rather awkward to handle. The blackthorn, with its white blossoms, is now abundant. In the hedges we may also find, towards the end of the month, the pretty climber known as the the white bryony, which bears two kinds of flowers. We must try to get specimens of both of these, as some of them show us the stamens and the others the carpels or pistil, but neither will yield both. In the hedge-row is growing the wild beaked-parsley. With these wild flowers we will also put some of the inmates of our gardens, which, as we shall see, are nearly related to them. The sweet-peas, sown in the autumn under a warm south wall, will now be in flower, and some of their blossoms may be put on one side with the prickly

furze. In the border, too, unless we are very good gardeners, we shall be almost sure to find that troublesome plant, with a creeping root and small white flowers, which we call the *gout-weed*. This may not be in flower yet if the month be cold, but if not let us take one or two of the large, much-divided leaves to compare with the beaked-parsley. From our kitchen-garden we shall get more help than from our flower borders this month. The gooseberry, currant, strawberry, and raspberry, and among fruit trees the pear, apple, plum, and cherry are now all in bloom, and, without robbing the trees, we may manage to get a few specimens of each for examination.

If we are able to search over the surface of any old stone walls or very dry banks, we shall probably find a little plant with small white flowers and a very sticky stem, which bears small, dry-looking leaves. This is a relation of the showy little plant cultivated on rockeries in gardens, the so-called 'London pride,' and is a *Saxifrage*. We will take a few plants to examine with our currants, of which it is a rather distant relation.

Returning indoors with our treasures, let us first examine our furze and sweet peas. The most careless glance sees at once the curious shape of the flowers. Because they are a little like a butterfly in form they are called *papilionaceous*. When we come to pull them to pieces we shall find they are not as easily dissected as the crowfoot for instance. The calyx appears at first sight to be in one piece, but when we look at it more closely we shall see in the case of the furze two, and in the case of the sweet pea five teeth-like divisions. Even the two divisions of the furze calyx can be seen to be further cut, for on one two, and on the other three very small teeth may be made out, corresponding thus to the five larger teeth of the sweet pea. There are in both really five sepals composing the calyx, but they are united together at their bases so as to form a cup-shaped body, which seems in the furze to be two-lipped. Because of this united condition the calyx is called *gamosepalous*, and this is one mark of the sub-class *Calycifloræ*. Passing on next to the corolla, we find that its petals are free, just as they were in the *Thalamifloræ*. The petals are not similar in size nor shape; and the corolla is therefore termed *irregular*. Taking them off one by one, we notice first a very large one at the back of the flower, which in the furze leans forward, but in the sweet pea is bent backwards about halfway up. This large petal is called the *vexillum* or *standard*, from a fancied resemblance to a banner. Just inside this and partly overlapped by it at the sides we have two smaller petals which spread somewhat outwards, and are called the *alae*, or *wings*. Removing these we seem to have only one petal left, which forms a small boat-like body and covers in the stamens. If we gently press the middle of it on the upper side, it springs into two, so that we have five in all, corresponding to the number of the sepals. This boat-shaped body is called the *carina* or keel. The standard, wings and keel so make up the *papilionaceous* flowers, which are found in all the English plants of the order. The stamens, which lie close together inside the keel, differ in their arrangement from the petals; they are not free, but are combined at their bases, like the sepals. The two specimens we have differ a little from each other. In both there are ten of them; in the furze they are all united for some little distance up, and form a single bundle, which can be detached in one piece. When stamens are combined thus, or cohere by their bases into one cluster, they are called *monadelphous*, forming one brotherhood. In the sweet pea nine of them are coherent together, and form a sort of trough open at the top. The remaining stamen is free and lies over the top of the trough, closing it in. As there are two brotherhoods here, they are said to be *diadelphous*. Now, if we look for their attachment to the other parts of the flower, we shall see they are not arising from directly under the ovary, but are apparently adhering a little to the calyx, so that they seem to spring a little way farther from the centre of the flower, and in a way to *surround* the ovary. This is the most characteristic feature of the Calycifloræ, and the term used to express the relation is *perigynous*. The pistil of the flower consists of one carpel only, in which we can still distinguish the three parts, ovary, style and stigma. It is attached above the origin of the calyx and stamens, and is therefore called *superior*.

The fruit of these plants is characteristic of the natural order to which they belong. It consists of a *pod*, or, to use the botanical term, a *legume*, and from this is derived the name of the order *Leguminosæ*. A legume is a fruit composed of one carpel only, which splits open or *dehisces* by two seams or *sutures*, one corresponding to the midrib of the carpel and the other to its edges. It bears the seeds on the upper side of the pod-valves. This natural order, Leguminosæ, the pea and bean tribe, is one of the largest and most important of those we shall study, and the English plants belonging to it are easily recognised by their papilionaceous flowers and pod-like fruit. The order furnishes us with valuable food-plants—peas, beans, and lentils; and with fodder for cattle—clover, trefoil, sainfoin, vetches, and lucerne. Timber is obtained from the rosewood, logwood, and acacia trees; other species yield the well known perfumes, Tonka bean and balsam of Peru. In medicine the products of the order are important, embracing senna, liquorice, balsam of tolu, catechu, and gum-arabic.

We will now take our next group—the blackthorn, and the blossoms of the strawberry, raspberry, pear, apple, plum, and cherry. We notice that they look at first sight very much like the plants we examined belonging to Ranunculaceæ, so prominent are the *indefinite* stamens in the centre of the regular flowers. The likeness, however, is only superficial; the plants of Ranunculaceæ have free sepals, which fall off before the fruit ripens; our new specimens have their sepals united, and when we can get the fruit we shall find that the calyx is persistent; the stamens in Ranunculaceæ are *hypogynous*, springing from under the pistil; in these they are perigynous, even more conspicuously than they are in Leguminosæ. The leaves again differ; our new ones have outgrowths of their bases just where they leave the stem; these are known as *stipules*, and are not found in Ranunculaceæ. The order we have now distinguished derives its name from one of its best known flowers, the rose—not the beautiful flower of our gardens, but one which we shall be able to find in the hedges next month, the dog-rose. It is called *Rosaceæ*.

The blossoms of the gooseberry and currant are not very conspicuous, being green in colour and of small size. They form part of a particular tribe which is now included in the natural order *Saxifragaceæ*, which

is also represented in one collection by the little Saxifrage we gathered from the old wall. This is a very large order, and is subdivided into several tribes of which we have representatives of two. The gooseberry has a gamosepalous calyx and five free petals. In these points the Saxifrage agrees with it and with the currant. The stamens in both are united to other parts of the flower. In the gooseberry the union of the calyx with the ovary is very complete ; it grows completely over its sides, so that both calyx and stamens seem to spring from the top of it. In the Saxifrage nearly the same condition is found, but sometimes the union is not carried quite so far. The ovary in the gooseberry and currant is said to be *inferior*, and in the saxifrages either inferior or *half inferior*. When the ovary is thus inferior the stamens are termed *epigynous* instead of perigynous. The two forms, perigynous and epigynous, are thus both found in Calycifloræ, while in Tholamifloræ we have only the *hypogynous* condition. In the Saxifrage we shall find another difference ; the ovary seems to be crowned with a small cushion or disc, and two styles spring from it, diverging as they leave it. This is not so marked in the gooseberry.

The fruit of the tribe *Ribesiæ* to which our garden specimens belong, is a berry, a fleshy, succulent fruit which does not split open or dehisce ; it contains a mass of juicy pulp in which the seeds are embedded in two rows, being attached to the inside of the skin. Some of the species belonging to this tribe, the pink flowering currant which was to be found in April for example, are very ornamental.

We will next look at our specimen of the beaked parsley. Like the other plants we have dissected, we find no trace of free sepals about it. Indeed, we cannot at first see anything like a calyx at all. There is a swollen inferior ovary, crowned as in the Saxifrage, by a sticky disc, with a short beak upon the top, from which spring the two diverging styles. There is to be noted, however, a thickish ring round the outside of the top of this ovary, which in some allied forms bears five very minute teeth. This, then, represents the calyx, which is in any case very inconspicuous. On the summit of the ovary, just inside this thickened rim, we have five delicate white petals, free from each other and very ready to fall off. Each is terminated by a fine point, which is bent inwards, the petal being in a way doubled over at about its middle point. Notice how the flowers are arranged on the stem. A large number of them spring from a common stalk, to the top of which they are attached together, and a number of these stalks also spring together from the apex of the flowering shoot. Because of its resemblance to the ribs of an umbrella the *inflorescence* or arrangement of the flowers on this plant is called an *umbel*. The leaves of this parsley and those of our gout-weed are very much alike, both being furnished with sheathing bases, and having their laminæ or blades very much divided. The very handsome leaves, showing almost every degree of division, are very characteristic of the natural order to which these two belong. The name of the natural order is *Umbelliferæ*, and among Calycifloræ it is marked by the epigynous stamens and petals gathered round a disc, by the inflorescence being umbellate, and by the characters of the fruit. These last we cannot examine at present, as it is not sufficiently advanced. This natural order is a very large and important one. Among the culinary vegetables belonging to it are the carrot, chervil, celery, parsley, parsnip, and fennel. Many umbelliferous plants furnish products of considerable use in medicine, such as assafœtida, gum-galbanum, coriander, carraway, dill, and anise. The stems of one of them, archangel, are candied as a sweetmeat, and an excellent pickle is obtained from the samphire, a species which grows on rocky sea-coasts. In collecting these umbellifers we must remember that some species, such as the hemlock and the fool's parsley, are exceedingly poisonous.

We have still left the sprays of the white bryony which we found climbing in the hedges. This is a very elegant plant, and possesses several points of interest. If we look along the stems we shall find that here and there are curious curled-up elongated organs, looking almost like fine branches. These are called tendrils, and it is by means of them that the plant is able to make its way through the bushy part of the hedge. As these are growing they come into contact with twigs or branches, and the touch of the foreign body causes them to curl round it, so giving the bryony the support it needs. The flowers are such as we have not yet met with among all the plants we have examined. As we noticed when we gathered it, there are two sorts of flowers, one growing on one plant and the other on a different one. A plant that is furnished in this way is said to be *diœcious*. We will first examine the flowers containing stamens but no ovary, the so-called male flowers. There is a green calyx and a corolla consisting of five petals, which slightly cohere at their bases. The petals are of a very pale green streaked with white. The stamens seem at first to be three in number, but two of them are much larger than the third. Really there are five, but four of them cohere in pairs to form the two large ones. The anthers, or sacs which contain the pollen, are sinuous, or curled into the shape of the letter U.

The other flowers are much like the male ones as far as the calyx and corolla are concerned, but they have in the centre, instead of the stamens, three diverging styles. The ovary is a small globular body situated below the calyx, that is *inferior*. We have not yet any of the fruit, but when this is ripe we shall find it to be a red berry. The bryony is the only English species belonging to the order *Cucurbitacæ*, to which belong the cucumber, vegetable marrow, gourd, pumpkin and water-melon, all edible fruits. The medicines colocynth and bryony are obtained from members of this family.

Let us now summarise the results of our month's work. First, to the eight brown sheets in which we arranged our Thalamifloral Dicotyledons we can now add a ninth, containing the dog violet and the pansy. This we must label "*Violaceæ, the violet tribe*," plants with syncarpous ovaries, having the seeds attached to their sides, with five stamens whose anthers slightly cohere, and with five irregular petals, the lower one prolonged into a spur.

To the sheet containing *Ranunculaceæ* we can add the traveller's joy, the anemone, the lesser celandine, the buttercup and King cup. Among the *Cruciferæ* we can place the wall-flower and the cuckoo flower.

It will be a good plan to enclose the Thalamifloral orders in a coloured wrapper, with the inscription 'Thalamifloræ, Dicotyledons with free petals and hypogynous stamens,' before we arrange the plants we have collected belonging to another sub-class in their brown paper sheets.

The first sheet of Calycifloral Dicotyledons will contain the furze and sweet pea, and will be labelled '*Leguminosæ: the pea and bean tribe;* plants with papilionæceous flowers, free petals, united perigynous stamens and leguminous or pod-like fruit.'

The second sheet will contain the blackthorn, and the blossoms of the strawberry, raspberry, pear, apple, plum, and cherry. It must be marked '*Rosaceæ: the rose tribe;* plants with stipulate leaves, persistent gamosepalous calyx, and indefinite free perigynous stamens.'

The third sheet will for the present have to be content with a single specimen, the beaked-parsley. It must be labelled '*Umbelliferæ:* plants with umbellate inflorescence, inconspicuous calyx, free and epigynous petals and stamens.'

The fourth sheet will contain the Saxifrage and the gooseberry and currant blossom. It will bear the inscription '*Saxifragaceæ, the saxifrage tribe;* plants with perigynous or epigynous stamens, inferior or half inferior ovaries, and two diverging styles.'

The fifth and, for the present, the last sheet, will contain the two specimens of Bryony. It must be marked '*Cucurbitaceæ, the gourd tribe;* diœcious plants, with five stamens resembling three by cohesion, inferior ovary and stem furnished with tendrils.'

We will now place these five sheets in a coloured wrapper bearing the label '*Calycifloræ:* Dicotyledons with free petals and perigynous or epigynous stamens.' Next month, when more flowers will be in bloom, we shall be able to make additions to both these sub-classes, as well as to investigate another large and interesting sub-class, called *Corollifloræ*. In arranging our sheets we must not forget to make on each a list of the useful and ornamental plants with which the order named furnishes us.

(*To be continued.*)

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SCIENCE NOTES.

Sulphur in the Development of Plants.—From some interesting experiments lately carried out by M. Berthelot and M. André, it would appear that sulphur is taken up by plants in two forms—as sulphates, and in the form of some complex organic substance. The plants experimented on at different stages of their development comprised *Camelina sativa*, *Sinapis alba*, *Sinapis nigra*, *allium cepa*, *Tropæolum majus*, *Lupinus albus*, and *Avena sativa*. The highest total amount of sulphur present in any of these cases was found in Tropæolum majus, where it was 1·2 per cent. of the dry weight of the young plant. The average amount through the series was less than this, being about ·5 per cent. MM. Berthelot and André are of opinion that the organic compounds in which sulphur occurs are oxidised with formation of sulphates in the stems of the plants, and that these, with the sulphates absorbed as such by the roots, travel up to the leaves where they undergo partial reduction. During the production of the flowers reduction also occurs there, at that time indeed more rapidly there than in the foliage leaves, organic compounds of sulphur being formed and gradually given off. On the commencement of flowering, the total amount of sulphur, which up to that period has gradually increased, remains stationary, or even slightly diminishes. The proportion existing in the form of organic compounds also decreases considerably, owing partly to the volatilisation of sulphur compounds from the flower, and partly to re-oxidation to sulphates.

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The Dangers of Aluminium.—Considerable drawbacks exist to the use of aluminium, which, as was recently pointed out in these columns, is securing considerable prominence in the arts. Züttert and Roscher find that the metal is to a certain extent dissolved in boiling water, and should therefore not be used for cooking utensils. As acetic, citric, and tartaric acids, Bordeaux and Moselle wines, tea and coffee also attack the metal, its application for canteens lately ordered by the Emperor in the German army seems especially unadvisable. Aluminium is reported to be injured also by carbonate of soda, soda, carbolic acid, salicylic acid, and boric acid, and by preserves and pickles in presence of table salt.

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The Effects of Electricity on Growing Crops.—Some recent interesting experiments show conclusively that electricity forms a valuable agent in the cultivation of fruit and vegetables. Mr. Specheneff, a Russian horticulturist, buried plates of copper and iron some distance apart in the ground, and connected them above ground by an iron wire. The current generated by the moisture of the earth thus circulated through the ground between the plates, and the result was the production of an unusually fine crop. A radish grew to be over 17 inches long and 5½ inches thick, while a carrot, which was 10½ inches in diameter, weighed 6½ lbs. An American horticulturist, Mr. Rawson, of Arlington, Massachusetts, has succeeded in forcing lettuces for the market a week earlier than usual by keeping an electric arc light going from dusk till midnight for a month in a greenhouse, 200 feet long by 24 feet wide. The cost of this experiment was £3. More interesting to the amateur gardener is Dr. James Leicester's mode of accelerating the growth of seeds by planting them betweem zinc and copper plates buried in the ground. Having filled a box about three feet in length with soil, he buried at at one end of it a copper plate about a foot square, and facing it at the other end of the box a zinc plate of the same dimensions. The two plates were then connected above the surface of the soil by a copper wire. Some hemp seed, sown under these conditions by him, grew to the height of an inch before other hemp seed sown in the usual way made its appearance above the soil.

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A New Method of Organic Analysis.—Instantaneous and complete combustion results from a method devised by M. Berthelot by which the substance to be analysed is burnt in an atmosphere of oxygen under pressure in a calorimetric bomb. The gaseous products are absorbed as usual in a system of tubes containing sulphuric acid and potash solution. The determination of carbon is thus effected with great precision, but that of hydrogen is rather more complicated. Sulphur in organic compounds can be determined very expeditiously by this method.

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Bacteria in the Mouth.—The researches of Dellevie into the micro-organisms found in the mouth present some rather important features. He states that upwards of a hundred different species of bacteria affect the mouth. The bacillus of pneumonia which is often found in the saliva of healthy persons, while remaining harmless only so long as the tissues of the lung are sound, may be the cause of abscesses in the surrounding of the teeth, and is often found in the processus mastoideus. *Staphlo coccus pyogenes aureus*, and *Shepto coccus pyogenes* which are almost always to be found in the mouth are the cause of the fur-producing property of saliva, and the convicts of New Caledonia are reported to take advantage of this fact by introducing detritus from the teeth under their skin to produce abscesses, and render themselves unfit for work.

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Artificial Human Milk.—While casein preponderates in the milk of cows, albumin is present in greater quantity in human milk. It is therefore proposed to add albumin to cows' milk in a form that is not susceptible of coagulation. Egg-albumin, or blood-albumin containing as much or more water than white of egg, is heated to a temperature of 150 deg. C. The coagulum formed at about 75 deg. C. is thus liquified and then remains permanently uncoagulable, so that it can be added to the cows' milk.

***

The Leaves of Eucalyptus.—An exhaustive investigation recently undertaken by Signor Briosi into the anatomical structure of the leaves of *Eucalyptus globulus* has caused him to regard the later vertical leaves, as an adaptation to the intensity of the light in order to prevent excessive transpiration. The glands in the leaves, which secrete the peculiar aromatic oil, are considered to be a protection against the action of heat. They occur abundantly, but irregularly, in the tissue of the leaf and are found also in organs which are destitute of stomata as the petiole, receptacle and ovary, and occasionally, though rarely, in the pith. The glands are of lysigenous origin. The cell walls adjoining the glands no longer give the cellulose reaction (a blue colour when treated with Iodine and strong sulphuric acid), and combine so completely that the gland resembles in appearance a closed sac.

***

The Influence of Thunder on Milk.—The experience of the housewife who finds that milk when kept cold is not turned rapidly sour during the occurrence of thunderstorms has lately received a scientific explanation. An Italian physicist, Professor

Tolomei, discovered that milk curdles during a thunderstorm in consequence of the ozone formed by the lightning oxidising it and generating lactic acid. A later investigator in this field, Mr. Treadwell, of Connecticut, finds the ozone thus produced fails to curdle sterilised milk which is kept from contact with unfiltered air. He is therefore of opinion that the curdling largely depends on the fostering of bacteria by heat.

* * *

AMMONIA AS A MOTOR POWER.—A tramcar fitted with a motor, which owes its power to the expansion of ammonia from the liquid to the gaseous state, will, it is prophesied in America, ultimately be a serious rival to horses, cables, and even electricity for street-tramway use. An experimental car now being run in the grounds of the 'World's Fair' at Chicago runs eighteen miles with one charge of ammonia, the pressure obtainable being nearly one hundred and fifty pounds on the square inch. The spent gas is absorbed in a water tank, and is capable of being extracted and used over again. The recharging only occupies two minutes, and the car is perfectly noiceless.

* * *

THE MOST EASILY DIGESTED CHEESE.—Cheese is admittedly difficult of digestion, but a German physiologist, Herr Klenze, is of opinion that there are degrees in its indigestibility. He considers Cheshire and Roquefort to be the cheeses lightest of digestion, and places after them in order of merit: Emmenthal, Gorgonzola, Neuchatel, Ramadour, Rotenburg, Maniz, Fromage de Brie, and Swiss cheese.

* * *

VINEGAR AND THE CHOLERA BACILLUS.—The cholera bacillus is reported to lose its vitality in fifteen minutes when immersed in vinegar, and the vinegar can be used without any fear of infection after that time. This conclusion agrees with the accepted opinion, that the bacillus propagates in the alkaline fluid of the intestines, and not in the stomach, when the latter organ is acid from the presence of gastric juice.

* * *

THE INFLAMMABILITY OF BUTTONS.—Celluloid, like aluminium, has certain dangers attending its use. The articles manufactured from it appear to be highly inflammable. In one case, some buttons exposed near a bright fire suddenly ignited; and the imitation amber mouth-piece of a pipe underwent rapid combustion when a lighted match was accidentally applied to it. Combs, hair-pins, and billiard balls, and other articles made of this substance, Professor Boys warns us, should be used with care.

* * *

THE SUNFLOWER AS AN ECONOMIC PRODUCT.—In the south of Russia a large variety of the sunflower has become an important economic product. The oil expressed from its seeds, which is yellow and without taste, is superseding olive-oil in the south of Russia for domestic purposes, and cattle are fed on the pressed seeds and on the boiled leaves, mixed with clay, while the stalks are utilised as fuel. The sunflower, like the eucalyptus, has the valuable property of drying marshy soil and counteracting the development of malarial germs. As the cultivation of the plant is very easy and the return considerable, efforts are being made to extend its area to Southern Hungary. J. R. G.

—o—

PUBLICATIONS REVIEWED.

Manual Instruction: Woodwork. By J. S. Barter; and Preface by G. Ricks, B.Sc. London: Whittaker and Co.

It has been a real pleasure to us to go through Mr. Barter's new book on Woodwork. We must congratulate the author and publishers alike on the production of so complete a work on a most popular branch of education. The book is divided into six chapters, dealing respectively with introduction (and we wish it had been shorter, and that the author had said less about sloyd, for we believe that it is a sensible, educational, and rational training), drawing, timber, tools, bench-work, and work-room fittings. The chapters on drawing, tools, and bench-work are well written and superbly illustrated. The exercises in Chapter V. appear to us to be too difficult, as a whole, for boys, such as are pictured in the pages of the work. We note one or two slips. The shooting-board said to be introduced in Model VI. is used in Model I., fig. 123. A little more careful grading of the exercises would, no doubt, have enhanced the value of the work, which certainly may claim to be one of the best attempts to provide matter and instruction for one of the most sensible subjects of our English elementary curriculum.

OUR PRIZE COMPETITIONS.

PRIZE ANECDOTE.

The following has been adjudged the best Anecdote sent in. A cheque for Half-a-Guinea has therefore been forwarded to the sender, Mr. W. R. ROBINSON, Lowther Street Board School, Carlisle.

SCRIPTURE EXAMINATION, APRIL, 1892.

Examiner: 'When Isaac went into the fields to meditate, what did he think about?'

Boy No. 1: 'Whether she would be a good-looking body.'

Boy No. 2: 'What a long time he was in getting her brought to him.'

Examiner: 'Well, perhaps so; but don't you think he would be thinking about his poor mother?'

(The boys failed to see this, and no hands were held up.)

We again offer a prize of half-a-guinea for the most *amusing* Anecdote connected with school life.

Competitors are requested to note—

(1) That they should write on *only one side* of the paper.

(2) That extracts from newspapers or books are excluded.

(3) That the judge reserves to himself the right to divide the prize between two or more competitors, and to print any anecdote submitted.

(4) That letters from parents, examination answers—indeed anything amusing connected with school life, is admissible.

(5) That all anecdotes should reach the office not later than the 15th of June, and be addressed—

The Editor of
'THE PRACTICAL TEACHER,'
5, Pilgrim Street, Ludgate Hill,
London, E.C.

Anecdote.

—o—

ERROR PRIZE.

The two first to point out an error in the May supplement were:—

Mr. J. T. HENDERSON,
Perkineville School,
Chester-le-Street.

and

Mr. M. ROBINSON,
Chilton Board Schools,
Ferryhill, co. Durham.

As these reached us by the *same post* we have had pleasure in remitting to each a P.O.O. for 5s. 3d.

☞ We offer a prize of Half-a-Guinea to the Teacher who is the first to point out an error in the answers to the set of Problematic Test Cards for Standard VII., presented with this issue.

Owing to pressure on our space we are compelled to hold over till next issue the following contributions:—'School Song,' 'In the Babies' Room,' 'Teachers' Notes of Drawing Lessons,' 'Common Sense Lessons in Housework,' 'Elementary Lessons in Agriculture,' 'Query Column,' 'Notes and Notions,' in addition to many Reviews.

Model Answers to Pupil Teachers', and Certificate Questions will be continued in the July number.

—o—

PITMAN'S SHORTHAND AS A 'SPECIFIC SUBJECT.'—Messrs. Isaac Pitman & Sons, Bath, offer a prize of five guineas for the best Essay on the Teaching of Pitman's Shorthand (Phonography) as a 'Specific Subject' under the New Code. The competition, which will close on 1st July, is restricted to teachers who have had actual experience in teaching Phonography in elementary schools. It is also stipulated that the essay must be of a thoroughly practical character, and show the value of Shorthand as a grant-earning subject. Full particulars may be obtained by sending a postcard to Bath.

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PROBLEMS.

STANDARD VII.

Card 1.

1. A shopkeeper bought 1,080 oranges at 8d. per dozen, 900 at 9d. per dozen, and 1,260 at 6d. per dozen. Find the average price per score.
2. In what time will £540 gain £103 5s. 6d. at 4½ per cent.?
3. Divide £100 among A, B, and C, so that for every £1 that A gets, B shall get £1 10s. and C £2 10s.
4. By selling ale at 5d. per quart a publican gains 25 per cent. What does it cost him per gallon?

Card 2.

1. A and B can do a piece of work in 3 hours, A and C in 4 hours, and B and C in 5 hours. How long would it take them working together?
2. The population of a city increased 12 per cent. from 1881 to 1891. The population in 1891 was 127,008. What was the population at the preceding census?
3. At what rate per cent. will £1,759 10s. amount to £1,869 9s. 4½d. in 1 year 8 months?
4. At what price do the Three-and-a-Half per Cents. pay 4 per cent., brokerage being ⅛ per cent.?

Card 3.

1. A builder gained 15 per cent. by selling a house for £391. What would have been his gain per cent. if he had sold it for £404 12s.?
2. A banker allows £3 interest every year on £100 deposited in his bank. What sum must be deposited so that in 6 years £4,602 can be withdrawn? (Simple interest being reckoned.)
3. If 8 gallons of brandy at 26s. a gallon are mixed with 11 gallons at 27s. a gallon, how much water must be added to make the mixture worth 25s. 8d. a gallon?
4. What is the price of the Three-and-a-Quarter per Cents. if £4,480 produces an income of £151 13s. 4d.?

Card 4.

1. What is the premium on a life policy for £5,860 at £2 14s. 7d. per cent.?
2. Divide £84 7s. 6d. among 7 men and 12 women, giving each man half as much again as a woman.
3. A shopkeeper marked goods at 30 per cent. above his cost price, but allowed 5 per cent. discount. What was his percentage of gain?
4. A and B can do some work in 4 days, A and C can do it in 5 days, and A, B, and C can do it in 3 days. How long will it take A alone to do it?

Card 5.

1. An income of £356 5s. was derived from investing in the Three-and-Three-quarters per Cents. at 97⅛, brokerage being ¼ per cent. What sum was invested?
2. I spent 10 per cent. of my money, and then 10 per cent. of the remainder, and had £141 15s. left. How much had I at first?
3. If 1¼d. is paid every calendar month for the loan of a sovereign, what is the rate per cent. per annum?
4. The rent of a house is lowered from £45 to £38 5s. What percentage of the first rent is the reduction?

Card 6.

1. What sum will gain £518 6s. 1½d. in 5½ years at 3½ per cent.?
2. After paying a tax of 7½ per cent. I had £2,590 left. What was my income?
3. 11 ac. 1 ro. yielded 29 tons 5 cwt., 12 ac. 3 ro. yielded 41 tons 14 cwt., and 16 ac. 2 ro. yielded 50 tons 2 cwt. What was the average per acre?
4. A can build a wall in 8 days and B can build it in 9 days, working 8½ hours a day. How long will it take them together, working 9 hours a day?

Card 7.

1. A bought a cow for £15 and sold it to B at a profit of 12½ per cent. B sold it for £15. What did B lose per cent.?
2. If £2,145 is invested in the Three-and-a-Quarter per Cents. at 89⅜, and the stock sold out when the price has risen to 92¼, what is the gain?
3. For what sum must goods worth £2,160 be insured at 4 per cent., so that in case of loss the value of the goods and the premium may be recovered?
4. A can beat B by 2 yards in 100 yards, and B can beat C by 3 yards in 100 yards; by how much can A beat C in 250 yards?

Card 8.

1. A man added 10 per cent. to his capital each year, and in 3 years it amounted to £6,655. Find his original capital.
2. In what time will £653 6s. 8d. amount to £816 5s. 2d. at 4¾ per cent.?
3. Find the average number of hours per month for the twelve months of 1892.
4. A man can do a piece of work in 6 days, and a boy can do it in 10 days. The man works at it alone for 2 days, and is then assisted by the boy. In what time will the work be finished?

Card 9.

1. If the interest on a sum of money is £84 10s. 6d. more at 6¼ per cent. than at 4½ per cent., what is the sum?
2. Divide £11 15s. between two persons, giving one 35 per cent. more than the other.
3. I sell £6,950 stock out of the Three per Cents. at 94, and invest the proceeds in the Four-and-a-Half per Cents. at 117½. Find the increase in my income.
4. Eggs were bought at 22 for a shilling, and sold at 3 for 2d. What was the gain per cent.?

Card 10.

1. The length of a room is 37ft. 6in., and the breadth is 24ft. 9in. What length of carpet 27 inches wide will cover it?
2. At what rate per cent. will £395 amount to £402 4s. 10d. in 4 months?
3. Tea at 1s. 4d. per lb. is mixed with tea at 1s. 10d. per lb. What should be the proportions of the mixture to be worth 1s. 8d. per lb.?
4. A person lends £1,050 at 4 per cent., £1,800 at 3½ per cent., and £750 at 6 per cent. What is his average rate of interest?

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Card 11.

1. A gentleman has a capital of £6,000; he invests half in the Four per Cents. at 125, and the other half in the Three-and-a-Half per Cents. at par. Find his income.

2. If one man walks 1,584 yards in a quarter of an hour, another 1,620 yards, and a third 1,746 yards, what is their average rate in miles per hour?

3. A horse was sold for £37 at a loss of 7½ per cent. What ought it to have been sold for to give a gain of 7½ per cent.?

4. A farmer bought cows at 13½ guineas each, and sold them at an average price of £18 7s. 6d., making a profit of £407 8s. How many cows did he purchase?

Card 12.

1. A person borrowed £3,500 at the rate of 4 per cent. per annum, to be repaid in four equal quarterly instalments with proportionate interest. What was the total amount of interest?

2. In what time will a sum of money treble itself at 4½ per cent. simple interest?

3. Four men went into partnership. The first put £900 in the business, the second £1,350, the third £1,560, and the fourth £1,290. They gained £1,785; what was the share of the first?

4. In a bag of coins $\frac{1}{8}$ are shillings, $\frac{2}{15}$ are sixpences, 45 per cent. are pennies, and the remainder consists of 20 halfpennies. How many coins are there in the bag?

Card 13.

1. What sum will amount to £2,040 10s. 3d. in 5½ years at 4⅜ per cent.?

2. A jeweller sold a watch for £18 and gained a third of the cost price. What was the cost price, and the gain per cent.?

3. A certain sum increased 10 per cent. and then doubled is £31 18s. Find the sum.

4. What percentage of interest is obtained from investing in the Three per Cent. Consols at 94⅜, brokerage being ⅛ per cent.? (Give the answer in £ s. d.)

Card 14.

1. If 6 men, 10 women, and 14 boys can do a piece of work in 8 days, how long will it take 9 men, 4 women, and 5 boys, 8 boys doing as much as 2 women, and 5 boys as much as 3 men?

2. 6 lbs. of tea at 1s. 2½d. per lb. are mixed with 10 lbs. at 1s. 4½d. per lb. At what price per lb. must the mixture be sold to gain 11⅓ per cent.?

3. What will £448 6s. 8d. amount to in 2 years 8 months at 3¾ per cent.?

4. A man is twice as old as his daughter, and twenty times as old as his grand-daughter. The daughter's age is 30. What is their average age?

Card 15.

1. A can do a piece of work in 2¼ days, B can do it in 2⅖ days, and C can do it in 2½ days. How long would it take them working together?

2. What is the rate of interest when £1,035 gets £163 0s. 3d. interest in 4½ years?

3. A person invested £1,050 in the Two-and-Three-quarters per Cents. at 87⅝, and sold out when they had risen to 90⅛. What did he gain, reckoning the usual brokerage on both transactions?

4. What is the cost price of an article which realises 4 guineas more if sold at 6 per cent. profit than at 8 per cent. loss?

Card 16.

1. A gentleman invested a certain sum in the Three-and-Three-quarters per Cents. at 98½, and sold out at 103¼. He gained £324. What sum did he invest, the usual brokerage being paid on both transactions?

2. Three persons hired a field for £35 7s. 6d. for a year. A put in it 14 cows for 13 weeks, B 28 cows for 9 weeks, and C 6 cows for 22 weeks. How should the rent be divided?

3. A flock of one hundred and twenty thousand sheep increased yearly at the rate of 5 per cent. What was the number at the end of 3 years?

4. What will be the remainder when 7·403 has been subtracted as many times as possible from 487·5?

Card 17.

1. An agent has to receive 12½ per cent. of the profits of an estate which cost £8,945. What must be the selling price so that he may receive £132 10s.?

2. At what rate per cent. will £1,095 amount to £1,101 15s. in 50 days?

3. A grocer bought 3½ cwt. of sugar at 2d. per lb., 5 cwt. at 1¾d. per lb., and 2½ cwt. for £2 11s. Find the average price per stone.

4. A digged ⅛ of a field in 2 days, and with the help of B finished it in 6 days more. How long would it have taken B alone to dig the whole field?

Card 18.

1. What sum will gain £55 19s. 5d. in 4 months at 8¾ per cent.?

2. By selling an article for 17s. 6d. a shopkeeper lost 12½ per cent. What should it have been sold for so that the loss would have been only 7½ per cent.?

3. If I can purchase £7,800 worth of 3½ per cent. stock for £6,405 15s., what is the price of the stock?

4. In a city there were 11,600 voters; 5,528 voted for one candidate, and 5,202 voted for the other candidate. What percentage did not vote?

Card 19.

1. A sum of money is lent at 3½ per cent. simple interest. How long will it take to gain ·35 of the principal?

2. A gentleman left £6,000 to be divided between his son and daughter in the inverse ratio of their ages. The son was 28 and the daughter was 17. What was the share of each?

3. A, B, and C are three pipes connected with a cistern. A can fill it in 1 hour, B can fill it in 1½ hours, and C can empty it in 50 minutes. If the cistern is empty, and the three taps are opened together, in what time will it be ¾ full?

4. A grocer sold tea at 1s. 8d. per lb. and gained 16 per cent. What would he gain or lose per cent. by selling it at 1s. 3d. per lb.?

Card 20.

1. The sum of £3,840 is invested in the Three-and-a-Half per Cents. at 96. How much must be invested in the Three per Cents. at 94½ to produce the same income?

2. A piano was sold for £40 at a *loss* of 4 per cent. If 4 per cent. had been *gained*, what would have been the selling price?

3. What number increased 60 per cent. amounts to 368?

4. If the simple interest on £284 7s. 6d. for 4 years amounts to £39 16s. 3d., what will be the simple interest on £198 15s. for 3 years?

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Card 21.

1. The average age of 26 girls is 12½ years. The eldest is 14 years and the youngest is 8 years. What is the average age of the rest?

2. What is the commission on £5,957 10s. at 15s. per cent.?

3. An estate belongs to A, B, and C. A's share is ⅖, B's is ⅜, and A's share is worth £9,500 more than C's. What is the value of the estate?

4. What is the difference between losing 12 per cent. and gaining 11 per cent. on goods which cost £134 3s. 4d.?

Card 22.

1. What sum must be invested in the Three-and-a-Half per Cents. at 94⅜ to obtain a half-yearly dividend of £350, brokerage being 2s. 6d. per cent.?

2. A builder sold a house for £413 more than it cost him, and gained 35 per cent. What did it cost him?

3. What sum will amount to £2,097 2s. in 8 months at 6½ per cent.?

4. The sum of £24 was divided among 5 men, 6 women, and 7 children, so that for every penny a child got a woman got 4½d. and a man got 6d. What was a child's share?

Card 23.

1. How long will it take £952·10s. to amount to £1,185 17s. 3d. at 3½ per cent.?

2. A train travelled 320 miles. It started at 1.45 p.m. and completed the journey at 10.5 p.m. What was the average speed per hour?

3. A shopkeeper gains 20 per cent. by selling eggs at 5 for 4d. What would be his percentage of gain if he sold them at 4 for 3d.?

4. If the length of a room is 26 ft. 4 in. and the area is 63 sq. yds. 5 sq. ft. 108 sq. in., what is the breadth?

Card 24.

1. A farmer had 75 cows, 80 per cent. more pigs than cows, and 80 per cent. more sheep than pigs. How many of these animals had he altogether?

2. At what rate per cent. will the interest on £2,297 10s. amount to £344 12s. 6d. in 5 years?

3. If 12½ lbs. of tea at 1s. 6d. per lb. are mixed with 9 lbs. at 1s. 3d. per lb., and the mixture is sold at 1s. 10½d. per lb., what is the gain per cent.?

4. I invested £12,483 6s. 8d. in the Three-and-Three-quarters per Cents. at 98⅝, and when the stock had fallen 1¼ per cent. I sold out. What sum did I receive?

Card 25.

1. A collector's commission amounted to £208 15s. 2d. If he was paid at the rate of 3½ per cent., what amount had he collected?

2. In a town of 80,000 inhabitants there was an average weekly death-rate of 42. Find the average number of deaths per annum per thousand.

3. The wages of a boy are half that of a man, and 10 boys and 14 men earn £57 in 12 days. What is a boy's daily wages?

4. What is the prime cost of a yard of silk when 200 yards are sold for £110 3s. 9d., realising a profit of 7½ per cent.?

Card 26.

1. What sum will gain £175 19s. 9d. interest in 4¾ years at 3½ per cent.?

2. If a broker buys at 15 per cent. discount, and sells at 15 per cent. premium, what is his gain per cent.?

3. Two estates of equal annual rental are rated at 2s. 8d. and 3s. 3d. in the pound respectively, and the rates for one are £86 0s. 10d. more than those for the other. What is the rental of each estate?

4. A bought an article for 30s. and sold it to B at a gain of 7½ per cent. B sold it for 43s. What did he gain per cent.?

Card 27.

1. At what rate per cent. must £780 be invested so that in 5 months it will amount to £794 12s. 6d.?

2. A man rode 11¼ hours at 8 miles an hour, then 7½ hours at 10 miles an hour, and then 45 minutes at 6 miles an hour. What was his average speed per hour?

3. For what sum must I insure a house worth £4,794 at 2s. 6d. per cent., so that in case of fire I may recover the value of the house and the premium?

4. A dealer sold 10 tons 4 cwt. of sugar for £219 18s. 9d. and gained 15 per cent. What did it cost him per cwt.?

Card 28.

1. In a war 13 per cent. of the soldiers were killed and 16 per cent. were wounded. If the remainder of a regiment numbered 5,609, what was the original number?

2. In what time will the interest on £1,743 6s. 8d. amount to £289 16s. 7d. at 3½ per cent.?

3. By selling eggs at a shilling a score a shopkeeper gains 20 per cent. What must he sell them at per dozen to gain 33⅓ per cent.?

4. A person invested £5,700 in the Three-and-a-Quarter per Cents. at 95, and sold out, making a profit of £150. What was the selling price?

Card 29.

1. If a coal-dealer buys coal at 18s. 9d. per ton and sells it at a gain of 26 per cent., what quantity must he sell to gain £95 1s. 3d.?

2. A person's income is decreased £43 2s. 6d. by the interest being reduced from 3¾ per cent. to 2½ per cent. What amount has he invested?

3. A broker bought 345 shares at 1⅜ per cent. premium, and sold them at ⅞ per cent. discount. How much did he lose?

4. A and B enter into partnership. A contributes £2,700 for 5 months, and B £1,800 for 4 months. They gain £575. How should the gain be divided?

Card 30.

1. A train travels at the rate of 30 miles an hour for 1 hour 20 minutes, and then at the rate of 25 miles an hour for 48 minutes. Find the average rate per hour for the whole time.

2. If 6 per cent. be lost by selling a horse for £35 5s., what would be the percentage of gain if sold for £40 10s.?

3. A sum of money was invested in the Four-and-Three-quarters per Cents. at 102½, and the half-yearly dividend was £465 10s. What was the sum invested, the usual brokerage being calculated?

4. Out of a barrel of beer 98·75 per cent. was sold. What quantity was left?

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Card 31.

1. Insurance is paid at the rate of 8¼ per cent. on a steamer. If the sum of £1,249 17s. 6d. is paid for insurance, what is the value of the steamer?

2. A cistern can be filled by a tap in 3 hours, and emptied by two other taps in 5 and 7 hours respectively. If the cistern is ⅛ full, and all the three taps are opened together, in what time will it be empty?

3. What sum diminished by 18 per cent. of itself gives £3 1s. 6d.?

4. By selling 51 yards of silk at 7s. 7d. per yard a draper gained 14s. 10½d. What was the prime cost per yard and the gain per cent.?

Card 32.

1. It was found that out of 18,950 persons 92 per cent. could read and write, 6 per cent. could only read, and the rest could neither read nor write. How many were there in each class?

2. How much stock in the Three-and-a-Quarter per Cents. at 98¾ can be purchased for £32,538, and what will be the half-yearly dividend? (Reckon brokerage.)

3. What sum will gain £57 12s. in 96 days at 4 per cent.?

4. The value of a ship's cargo is 60 per cent. of the value of the ship, and the ship and cargo are together worth £10,240. What is the value of the cargo?

Card 33.

1. A can do a piece of work in 8 hours, B in 9 hours, and C in 12 hours. If they work together, and 5s. 9d. is paid for the work, what should each receive?

2. In what time will £325 gain £232 7s. 6d. at 3½ per cent. simple interest?

3. A grocer bought tea at £9 8s. 4d. per cwt. At what price must he sell it per lb. to gain 12 per cent.?

4. A person gained £500 in business the first year, and every year gained 10 per cent. more than in the preceding year. What was his annual average gain in 4 years?

Card 34.

1. A gentleman sold £5,250 stock out of the Three per Cents. at 92, and re-invested in the Three-and-Three-quarters per Cents. at 103½. Find the improvement in his income.

2. An article was sold for £4 7s. at a gain of 16 per cent. What would have been the selling price if 20 per cent. had been gained?

3. A village contained 239 males and 361 females; find the percentage of each.

4. A can reap 4 acres in 5 days, and B can reap 7 acres in 9 days. In what time can A and B together reap 85½ acres?

ANSWERS.

Card 1.
1. 1s. 0½d.
2. 4¼ years.
3. A £20; B £30; C £50.
4. 1s. 4d.

Card 2.
1. 2¾¼ hours.
2. 113,400.
3. 3¾ per cent.
4. 87⅞.

Card 3.
1. 19 per cent.
2. £3,900.
3. 1 gallon.
4. 96.

Card 4.
1. £159 18s. 7d.
2. Man £5 12s. 6d., woman £3 15s.
3. 23½ per cent.
4. 8¼ days.

Card 5.
1. £9,286 5s.
2. £175.
3. 6½ per cent.
4. 15 per cent.

Card 6.
1. £2,692 10s.
2. £2,800.
3. 2 tons 19⅞ cwt.
4. 4 days.

Card 7.
1. 11⅛ per cent.
2. £69.
3. £2,250.
4. 12⁷/₁₀ yards.

Card 8.
1. £5,000.
2. 5¼ years.
3. 732 hours.
4. 4½ days.

Card 9.
1. £4,830.
2. £5 and £6 15s.
3. £41 14s.
4. 22⅞ per cent.

Card 10.
1. 137½ yards.
2. 5¼ per cent.
3. 1 lb. at 1s. 4d. to 2 lbs. at 1s. 10d.
4. 4½ per cent.

Card 11.
1. £201.
2. 3¾ miles.
3. £43.
4. 97 cows.

Card 12.
1. £87 10s.
2. 44⅞ years.
3. £315.
4. 240 coins.

Card 13.
1. £1,623 15s.
2. £13 10s.; 33⅓ per cent.
3. £14 10s.
4. £3 3s. 5¹⁷/₂₁d.

Card 14.
1. 12 days.
2. 1s. 5½d.
3. £493 3s. 4d.
4. 31 years.

Card 15.
1. ¹²⁵/₁₃₆ day.
2. 3½ per cent.
3. £30.
4. £30.

Card 16.
1. £7,101.
2. A £11 7s. 6d.; B £15 15s.; C £8 5s.
3. 138,915 sheep.
4. 6·305.

Card 17.
1. £10,005.
2. 4½ per cent.
3. 2s. 3d.
4. 18 days.

Card 18.
1. £1,919.
2. 18s. 6d.
3. 87¾.
4. 7½ per cent.

Card 19.
1. 10 years.
2. Son, £2,266 13s. 4d.; daughter, £3,733 6s. 8d.
3. 1 hr. 36¾ minutes.
4. 13 per cent. loss.

Card 20.
1. £4,410.
2. £43 6s. 8d.
3. 230.
4. £20 17s. 4½d.

Card 21.
1. 12⅝ years.
2. £44 13s. 7½d.
3. £36,000.
4. £30 17s. 2d.

Card 22.
1. £18,900.
2. £1,180.
3. £2,010.
4. 7s. 6d.

Card 23.
1. 7 years.
2. 38¾ miles.
3. 12½ per cent.
4. 21 ft. 9 in.

Card 24.
1. 453 animals.
2. 3 per cent.
3. 34⅛ per cent.
4. £12,316 13s. 4d.

Card 25.
1. £6,423 6s. 8d.
2. 27·3.
3. 2s. 6d.
4. 10s. 3d.

Card 26.
1. £1,140.
2. 35¹/₁₇ per cent.
3. £2,950.
4. 33⅓ per cent.

Card 27.
1. 4½ per cent.
2. 8⁷/₁₃ miles.
3. £4,800.
4. 18s. 9d.

Card 28.
1. 7,900 soldiers.
2. 4½ years.
3. 8d.
4. 97½.

Card 29.
1. 390 tons.
2. £3,450.
3. £776 5s.
4. A £375; B £200.

Card 30.
1. 28¼ miles.
2. 8 per cent.
3. £20,065 10s.
4. 2¼ gallons.

Card 31.
1. £15,150.
2. 87½ hours.
3. £3 15s.
4. 7s. 3½d.; 4 per cent.

Card 32.
1. 17,434; 1,137; and 379.
2. £34,800; £565 10s.
3. £5,475.
4. £3,840.

Card 33.
1. A 2s. 3d.; B 2s.; C 1s. 6d.
2. 22 years.
3. 1s. 10d.
4. £580 2s. 6d.

Card 34.
1. £17 10s.
2. £4 10s.
3. Males 39½ per cent., females 60½ per cent.
4. 22½ days.

N.B.—No teacher can win more than one prize in six months.

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